SEA AND INLAND

FISHERIES

REPORT FOR 1962

AN ROINN TAILTE, FO-ROINN IASCAIGH,
(Department of Lands, Fisheries Division)
DUBLIN.

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REPORT

OF THE

MINISTER FOR LANDS

ON THE

SEA AND INLAND FISHERIES

FOR THE YEAR

1962

PART I

SEA FISHERIES

A notable event in 1962 was the publication of a Government White Paper in April outlining an intensified *Programme of Sea Fisheries Development* providing a variety of incentives to stimulate the development of the sea-fishing industry so that it will more rapidly and effectively contribute to the expansion of the national economy. Among outstanding features of the programme were a new deal for existing hire purchasers of fishing boats, improved facilities for purchase of new and second-hand boats and new engines, expansion of training schemes, increasing emphasis on market development and reorganisation of An Bord Iascaigh Mhara.

The total value of landings of sea-fish in 1962 was £1,498,995 showing an increase of £141,753 on the figure for 1961. All sectors shared about equally in this increase, the demersal catch improving from £820,911 to £866,547, pelagic landings from £258,645 to £302,654 and shellfish from £277,686 to £329,794. Fishing under these three heads is accounted for in more detail in subsequent sections of this report.

The following table gives particulars of the quantity and value of sea-fish landings (excluding shellfish) since 1953.

TABLE 1.

Year		cwt.	£
1962	...	441,149	1,169,201
1961	...	516,207	1,079,556
1960	...	688,421	1,271,980
1959	...	592,319	1,205,971
1958	...	547,377	1,025,505
1957	...	532,475	907,119
1956	...	377,367	787,160
1955	...	303,519	686,195
1954	...	254,714	635,802
1953	...	222,516	545,105

Appendix No. 1 contains details of the varieties of sea-fish landed in 1962, and the average value per cwt. for each variety from 1955 onwards is shown in Appendix No. 2.

The usual arrangements were continued during the year permitting imports of some varieties of white fish, mainly plaice, to meet shortages of home landings of those varieties. Supplies of herrings were also imported at times when home landings were insufficient.

In order of value of fish landed, the principal ports in 1962 were:—Castletownbere, Howth, Killybegs, Dunmore East, Dingle and Galway.

DEMERSAL FISHERY.—The quantity of demersal fish landed in 1962 was 230,110 cwt. or 17,407 cwt. more than in 1961. As in previous years, whiting was taken in by far the greatest quantity accounting for almost half of the total demersal catch and showing an increase of over 20,000 cwt. on the 1961 figure. Ray, plaice, cod, pollack and haddock followed whiting in order of landed weight. There was a small decrease, however, in the landings of haddock, plaice, cod, dabs, ray and turbot as compared with 1961.

The value of the demersal fish catch increased to £866,547 or 5.5% over the 1961 figure. Of the flat species, soles, brill, turbot and plaice registered increases in unit value while dabs and megrims showed very slight reductions. Whiting alone of the round fish suffered a decrease in unit value and the drop in this case was marginal. Demand for all varieties was good and occasionally there were insufficient home catches of the better class round and flat fish to satisfy requirements. Some 9,046 cwt. of small round whiting landed on the east coast, however, was not in demand for human consumption and was disposed of for reduction to meal.

The popularity of trawling continued to grow among Irish skippers largely because of relatively lower operational costs. Investment in good second-hand trawlers from Scotland increased in 1962 and such vessels, ranging from 60 to 72 ft. in length, have been proving very productive in the hands of capable skippers.

The following table shows quantity, total value and average value per cwt. of demersal fish in the past ten years.

TABLE 2.

Year	Cwt.	£	Average value per cwt.
			s. d.
1962 ...	230,110	866,547	75 4
1961 ...	212,703	820,911	77 2
1960 ...	233,785	818,828	70 1
1959 ...	258,178	800,698	62 0
1958 ...	258,978	717,306	55 5
1957 ...	259,722	693,330	53 5
1956 ...	225,488	660,674	58 7
1955 ...	193,916	593,190	61 2
1954 ...	169,926	540,690	63 7
1953 ...	147,757	451,901	61 2

PELAGIC FISHERY.—*Herrings* :—The landings of herrings on the Irish coast fell considerably in 1962 although the value showed a satisfactory increase reflecting the buoyant demand which existed in British and Continental markets, particularly in the latter part of the year. The unit price improved from 16/9d. per cwt. in 1961 to 27/9d. compensating fishermen somewhat for the quantitative decline. The weather during the period October to December was on the whole less favourable than usual and, in addition, late arrival of shoals off Dunmore East affected the landings.

The Dunmore East landings in 1962 took place in the first and last quarters of the year, that is, parts of two fishing seasons. In January adverse weather reduced landings considerably while by February, when some improvement came in the weather, the catching power of the fleet was reduced by the withdrawal of some Six County boats that had been operating there. The season closed with some very light landings early in March. Late in October small catches were taken by local boats but, despite fairly thorough searching by a fleet of up to 28 boats aided by the exploratory fishing vessel, *Cú Feasa*, no sizeable landings were made before the end of November. Catches in the early part of December were generally poor due to unfavourable weather but in the second half of the month landings of over 1,000 cran per day were regularly made. While the total quantity landed during October to December showed a fall of some 5,000 cran from the 1961 figure of 20,500 cran, the value of the catch rose considerably. Trawling was the most widespread and profitable method of fishing in the area, other gear in use being, purse seines, ring nets and drift nets.

Continental buyers were active at Dunmore in January and February and, while they were again present from October onwards, their purchases were not as large as in previous years due to the lighter landings and high prices which generally prevailed. The English market absorbed considerable quantities for freshing during the last quarter of the year. Purchases by Irish processors, for rough packing and freezing, were not extensive, again due to the scarcity and high prices ruling at auction.

The Donegal fishery in the early part of the year was also affected by adverse weather. Gales and heavy seas brought fishing virtually to a close in the first week of January and only small landings were made for the remainder of the month. In February markings of good shoals were found off Rathlin O'Beirne Island but, after a single day's fishing, operations had to be abandoned on account of bad weather ; the area was only intermittently fished in the succeeding few months with limited success. The Donegal fishery re-opened in mid-October with landings of about 1,000 cran by the Killybegs fleet up to the end of that month. This fishing continued throughout November and December, with landings of about 4,500 cran in each month, which fetched fair to good prices. The composition of the

Killybegs catch was mainly full herrings with approximately a 40% admixture of spent fish which came mostly at the end of the season. A feature was the notable success of the trawling fleet, especially the pair trawlers which had a profitable season. A large proportion of the Killybegs catch was purchased by processors in the Six Counties, Scotland and northern England. No herrings were reduced to meal as the buoyant demand of the freshing and processing trades maintained prices in excess of the economic price for fishmeal manufecture.

January's weather curtailed operations in the Burtonport area, only one day's fishing being possible in that month. Herrings were not relocated in this area until May when in the grounds near Tory Island good markings were noted; the shoals, however, remained too far offshore for successful exploitation by the local trawlers. November saw some fair landings from Burtonport grounds by ring net boats and these landings lasted well into December when weather hampered continuation of fishing. The bulk of the herring from this area was taken for rough packing and marinating locally; agents for processors operating in the Six Counties and England also purchased some supplies. Fishing from Bunbeg by drift net yawls during November resulted in landings of herrings of the large, full type. Comparatively successful fishing was also experienced in November by drift net yawls working in the Inver area.

Killybegs and Burtonport boats using ring nets and mid-water trawls, again took part in the Achill herring fishery in September and October but the shoals proved sporadic and the total catch was about the same as in 1961. The chief landing centre was Westport where catches were disposed of at satisfactory prices for freshing, marinating and freezing. A few small local boats continued fishing with irregular landings at Purteen during November.

Landings of herring also took place during the year at Howth, Cahore, Rosslare and Dingle; instruction in pair trawling was given at Dingle by two east coast skippers under an arrangement sponsored by An Bord Iascaigh Mhara.

The following table shows the quantity, total value and unit value of herrings landed in the past ten years.

TABLE 3.

Year	Cwt.	£	Average value per cwt.
			s. d.
1962 ...	187,534	260,463	27 9
1961 ...	250,078	209,710	16 9
1960 ...	417,414	394,945	18 11
1959 ...	308,064	364,130	23 8
1958 ...	252,759	268,579	21 3
1957 ...	233,365	173,027	14 10
1956 ...	137,849	101,608	14 9
1955 ...	96,560	73,782	15 3
1954 ...	68,322	72,848	21 4
1953 ...	58,981	70,066	23 9

Pilchards :—While landings of pilchards during the year were light, the total catch was more than double that for 1961. Quantities totalling about 5,000 cwt. were taken at Westport in September, Killybegs in October and Rosbeg in November and were readily absorbed for fish meal production.

Sprats :—In 1962 sprat shoals did not materialise as usual off the Donegal coast and this failure caused disappointment to the fishermen and to the operators of the Killybegs fishmeal factory who had arranged to take available supplies.

Mackerel :—The total quantity of mackerel taken in 1962 declined to 16,475 cwt. Prices were considerably higher than in 1961, however, and the total value of the catch showed a slight increase to £39,297. At Baltimore, the main centre of activity, landings from March to July were much less than those of the same months in 1961. Fewer boats took part in the fishery in this area and the weather militated against successful drift netting. Some quantities were also landed by drifters at Schull, Castletownbere, Dingle and Kinsale. Hand lining with feathers at various points along the south and west coasts augmented the incomes of lobster fishermen.

Statistics of mackerel landings over the past ten years are given in the following table.

TABLE 4.

Year	Cwt.	£	Average value per cwt.
			s. d.
1962 ...	16,475	39,297	47 5
1961 ...	24,007	38,238	31 10
1960 ...	37,125	58,144	31 4
1959 ...	25,645	40,978	31 11
1958 ...	35,490	39,570	22 4
1957 ...	22,913	36,209	31 7
1956 ...	13,850	24,815	35 10
1955 ...	11,563	18,913	32 9
1954 ...	14,766	21,967	29 9
1953 ...	15,374	22,976	29 11

SHELLFISH.—The downward trend in the value of the shellfish catch that had been evident since 1959 was arrested in 1962 when the value of £329,794 registered an increase of almost 19% on the 1961 figure. This improvement was due more to increases in the unit value of most varieties rather than to any significant overall increase in the quantities landed. Lobsters and crawfish were together responsible for more than half of the total shellfish value despite quantitative decreases in each variety, particularly crawfish. Adverse weather up to early July frequently kept boats in port and many of the bigger vessels, especially those located along the south-west, west

and north coasts, did not fish at all for crawfish in 1962. Considerable losses in pots were experienced by fishermen during the gales which struck all coasts in June and many boats found their catching power seriously reduced as a result. Crab fishing also suffered from the weather. Escallop fishing showed a very satisfactory improvement, the quantity landed and the overall value being in each case more than double that for the previous year. The take of oysters at 1,750,000 showed further improvement, being up by almost 25% on the figure for 1961. The mussel catch underwent a considerable reduction—from 15,000 cwt. in 1961 to 6,000 cwt. in 1962—this drop being mainly due to an unexpected falling off in the quality of the mussels at Mornington, Co. Louth, which abruptly terminated commercial fishing at this centre. Plans for improvement of the Mornington fishery by means of a transplantation scheme were in train at the end of the year. Landings in the Cromane area were not quite as heavy as in the previous year, but transplantations carried out in 1961 and 1962 laid the foundation for more successful operations in future. The catch of Dublin Bay prawns increased particularly on the east coast where boats which normally cease prawn fishing in late September continued trawling for this variety up to the end of the year. Demand was good and prices improved, especially for the better quality fish to which fishermen are devoting more attention.

Continental demand for Irish shellfish remained good and competition for the reduced landings was responsible for the increased unit price for most varieties. The installation of modern storage plants and the construction of up-to-date premises for handling the shellfish catch have been continued by private interests who have spared no effort to maintain the high reputation of their products.

Table 5 gives the value of shellfish landings in the past ten years.

TABLE 5.

Year		£
1962	...	329,794
1961	...	277,686
1960	...	339,625
1959	...	402,716
1958	...	291,255
1957	...	239,968
1956	...	233,634
1955	...	196,103
1954	...	154,525
1953	...	142,554

PERSONNEL AND VESSELS.—The total number of men engaged in sea-fishing in 1962 was 5,697, comprising 1,626 full-time and 4,071 part-time fishermen, which was almost the same as in 1961.

The number of motor vessels of 15 gross tons and over solely engaged in fishing in 1962 was 225 as compared with 227 in 1961. Fifteen vessels, many of which were in the 50 gross tons or over category, were added to the fleet during the year and their aggregate gross tonnage was more than sufficient to offset the loss occasioned by withdrawals. Detailed figures are given in Appendix No. 7.

TRAINING OF FISHERMEN.—Schemes for the training of fishermen as skippers and of boys as fishermen continued in operation. Under that for training fishermen as skippers, applicants must not be less than twenty years of age and have at least three years' sea-fishing experience. Trainees are paid weekly allowances. The training lasts for a maximum period of twenty-eight weeks—not more than twelve being devoted to the practical course on selected fishing boats and sixteen to the theoretical course at the Town of Galway Vocational School. The duration of the practical course at sea depends on the experience of the individual trainee.

Interviews for admission were held early in 1962 and fifteen fishermen were selected for training. Of this number, ten completed the course and were successful in obtaining Certificates of Competency.

For admission under the scheme for training boys as fishermen, applicants are required to be not less than sixteen years of age. Previous sea-fishing experience is not necessary. Boys are assigned to selected fishing boats and allowances are payable to them for not more than two years while undergoing training as deck hands on the vessels. A boy being trained as an engineman will also be given training ashore during which his allowance may continue for a further six months.

At the beginning of 1962, nineteen boys were undergoing training. In the course of the year interviews were held at centres throughout the country and a further thirty-six boys selected were assigned for training. Of the fifty-five, twelve became full crew members on a share basis making a total of twenty-four who had so qualified since the inception of the scheme late in 1959. Six boys withdrew and the remaining thirty-seven were still in training at the end of the year.

AN BORD IASCAIGH MHARA.—During the year 1961/62 the Board received from Fisheries Vote a grant of £48,662 in aid of administration and grants amounting to £87,061 for general development. Repayable advances totalling £112,000 were also made to the Board from the Central Fund for boats and gear.

The Tenth Annual Report and Accounts of the Board covered the twelve months ended 31 March, 1962, and the following are some of the main points recorded:—

Eleven new boats were issued on hire purchase; issues of boats and gear were valued at £160,655. The number of motor fishing

boats on hire purchase at 31st March, 1962, was 132, valued at £991,539 at time of issue.

The quantity of fresh sea-fish (excluding shell fish and imported fish) handled by the Board during the year was 125,039 cwt. (an increase of 3.3% on the figure for 1960/61) valued at £490,355 (a reduction of 1.3%). The reduced turnover together with increased costs of salaries and wages resulted in a marketing loss of £6,858 as compared with £3,164 in the preceding year.

While, as in previous years, production at the Killybegs and Galway processing factories was well below capacity, frozen and smoked fish production was the highest recorded since the opening of these premises; processing was not undertaken at the Schull factory during the year. For the three factories there resulted an overall loss of £13,751 or £6,881 less than in the previous year.

The manufacture of ice was continued at Killybegs, Cleggan, Galway, Dingle, Castletownbere, Schull, Ballycotton and Dunmore East. While sales expanded by 23% as compared with the previous year, there is still need for using much greater quantities of ice. A grant of £6,000 from the Exchequer was repeated to help in keeping the selling price to fishermen at a reasonable level.

The Boatbuilding Account showed a loss for the first time—the figure being £6,177, as compared with a profit of £3,131 in the previous year—and the profit on the Boats and Gear Trading Account declined to £1,853 as compared with £3,712 in 1960/61. During the year seven boats were taken back from unsatisfactory hire-purchasers and, in the light of the continued worsening of the position of hire purchase accounts, it was considered prudent to reserve a further sum of £20,940 against bad and doubtful debts. After allowing for writing off £186,000 in respect of advances to the former Sea Fisheries Association for boats and gear, the deficit carried to the Balance Sheet from the Boats and Gear Profit and Loss Account was £214,364.

SEA FISHERIES PROTECTION.—Protection of the inshore fisheries involving regular patrols by vessels of the Naval Service of the Department of Defence was maintained. Prosecutions were instituted against the skippers of five foreign fishing boats found within the exclusive fishery limits and convictions were obtained in all cases, resulting in fines and forfeiture of fish and gear. In the conduct of these proceedings and in the enforcement of fishery regulations generally there was effective co-operation from the Garda Síochána.

MARINE WORKS.—At the centres chosen for development as major fishery harbours preparatory investigation work by the Commissioners of Public Works made further progress.

It was decided to substitute Dunmore East for Passage East in the programme of development. This change was made on the advice

of the Swedish consultant who considered that the subsoil conditions disclosed by trial borings at Passage East were unfavourable. Site investigations were carried out at Dunmore East and an estimate of cost of the necessary works was being prepared at the end of the year.

Site investigations were also completed at Killybegs during 1962 and arrangements made to design specialised foundations to suit the site conditions disclosed. For Galway, borings on the site were completed and model investigations were commenced at the Hydraulics Research Station, Wallingford, Berkshire, England. Site investigations were concluded at Castletownbere and preliminary design work was put in hands. At Howth, for which model investigations were completed, borings on the site were begun.

Various proposals for minor marine works in the fishery interests —harbour dredging, construction and improvement of piers, installation of navigation lights, etc.—were examined in consultation with other Departments and the local authorities concerned.

During the year work was completed on improvements at Dursey Sound (Co. Cork), Cleggan (Co. Galway), Kilcummin (Co. Mayo) and Bunbeg (Co. Donegal). Among the works in progress or approved for purposes of State grants the more important were Greencastle (Co. Donegal) and Clogherhead (Co. Louth)—deepening and improvement of harbours; Burtonport (Co. Donegal)—erection of navigation lights; and Enniscrone—provision of increased berthage.

EXPLORATORY VESSEL.—*Cú Feasa.*—Eleven fishery research voyages were made during the year and comprised surveys of herring larvae and investigations on whiting, hake and Dublin Bay prawns which are mentioned in the next section of this report.

Seven trips were undertaken for the purpose of searching for shoals of pelagic fish in the waters off Donegal, Mayo, Cork, Waterford and Wexford and in the Irish Sea. The vessel was successful in locating shoals off Mayo and off the south-east coast and directed fishermen to them.

SCIENTIFIC INVESTIGATIONS.—*Herring*:—Investigations into the herring populations along the Wexford and Waterford coasts were carried out during the main Dunmore East fishing season in January, November and December on much the same lines as in previous years. Adult herrings were sampled intensively from this area and, as far as possible, from adjacent areas. Young herrings taken in the sprat weirs of Waterford Harbour were also examined. Owing to the inclement weather it was not found possible to use beach seines to the same extent as in former years in the search for young herrings but some investigations by this method were carried out. A comparison between the length of the young herrings of less than a year old taken by beach seines in former years and the estimated first year length in the three-year old recruits into

the fishery was commenced. A report on the herring stocks of the Dunmore East region in the 1961/62 season was submitted to the Herring Committee of the International Council for the Exploration of the Sea.

Herring investigations were extended to the Achill area during September and to the Killybegs area from May to October, inclusive. Collections of material from these areas were made as a preliminary to expanding the investigations in future years. A report on the Achill fishery appears as Appendix No. 27 to this report.

In connection with the herring investigations along the south coast of Ireland Carruther's vertical log current meters were, with the co-operation of the Commissioners of Irish Lights, again installed on the Coningbeg and Daunt Rock lightships. The instruments in question were kindly provided by the National Institute of Oceanography. The results of the observations made, which were incorporated in a paper submitted to the Hydrographical Committee of the International Council for the Exploration of the Sea, will help towards an assessment of the effect of the currents on the dispersal of herring larvae from the spawning area of the Dunmore East herrings.

The beach seine operations for herring brought to light a considerable amount of material relating to species other than herring. This material, together with similar material from the sprat weirs, was worked out during the year and a report was being prepared.

Whiting:—The whiting investigations around the Irish coasts and in particular in the Irish Sea were continued with the aid of the *Cú Feasa* and by sampling the catches of commercial fishing vessels. The size distribution, age, growth and sexual maturity of the fish were studied and the effect of using different mesh sizes was investigated. A preliminary report upon these investigations was submitted to the Near Northern Seas Committee of the International Council for the Exploration of the Sea. Preparations were also made for the tagging of whiting in the Irish Sea.

Plaice, mackerel, hake, etc.:—Investigations were started into the stocks of plaice, mackerel and hake around the Irish coasts. Samples of plaice and mackerel were obtained from the Dublin and other markets for examination and a procedure was worked out for the age determination of plaice and mackerel by means of the otoliths (*ear-stones*). Towards the end of the year preparations were put in hand for the tagging of plaice and certain forms of dogfish.

Identification, etc. of miscellaneous fish specimens:—Specimens of fish were identified for the Irish Specimen Fish Committee and members of the public. The response of fishermen, particularly in the Dingle area, to the Department's request for specimens of rare fishes continued to be encouraging. Small rewards are paid for these fishes and during the year interesting specimens of fish, rare or

scarce in Irish waters, were recorded. A specimen of the rabbit fish (*Chimaera monstrosa*) was taken on the New Ground in Dingle Bay on 10 November. This species, which is known to be very abundant in the deep water off the south-west of Ireland has only once before been recorded from Irish waters under 100 fathoms deep. Another specimen of the Mediterranean Ling (*Molva macrophthalma*) was taken on 9 June on the New Ground in Dingle Bay close to where a similar specimen had been previously recorded in 1961. Two black-mouth dogfish (*Pristiurus melanastomus*) from the Irish Sea and Dingle Bay were taken on 17 July and 9 November, respectively, bringing the total recorded to eight. Three pilot fish (*Naucrates ductor*) were recorded in 1962, one from Ballycotton, Co. Cork, and two from Smerwick Harbour, Co. Kerry, bringing the total recorded up to seven. Four blackfish (*Centrolophus niger*) were recorded, one from Ballycotton, two off the north coast of Mayo, and one from 10 miles south of Castletownshend. Only five previous specimens have been recorded from Ireland. A single specimen of the file or trigger-fish (*Balistes capriscus*) was recorded on 9 August from a salmon weir in Waterford Harbour, bringing the total recorded from Ireland to nine.

Specimens of fish, which must be classified as scarce rather than rare, recorded in 1962, included the torpedo or electric ray (*Torpedo nobliana*), great silver smelt (*Argentina silus*), the boar-fish (*Capros aper*), Ray's bream (*Brama raii*), the red band or red snake fish (*Cepola rubescens*), and the scald fish (*Arnoglossus imperialis*). Three large specimens of the halibut (*Hippoglossus hippoglossus*) were also recorded during the year.

A report by the Inspector and Scientific Adviser on the occurrences of rare or scarce fish in Irish waters during 1962 was accepted for publication by the *Irish Naturalist's Journal*.

Lobsters :—The lobster investigation in progress since 1957 was completed in 1962 and a paper on the subject was in course of preparation. The diseases of lobsters were also studied during the year.

Crawfish :—A start was made in investigating the stocks of the commercially important crawfish, sometimes called crayfish or spiny lobster (*Palinurus vulgaris*), at selected places along the Irish coasts. A report upon these investigations was submitted to the Special Meeting of the International Council for the Exploration of the Sea.

Oysters :—The oyster stocks in several areas of the coast were kept under review and advice was given to persons interested in developing oyster beds. A paper on the history of the Irish oyster fishery by the Inspector and Scientific Adviser was published in the *Proceedings of the Royal Irish Academy*. Ultra-violet installations for purifying oysters were inspected during the year.

Prawns :—The stocks of Dublin Bay prawns (*Nephrops norvegicus*) along the east, south and west coasts were investigated with

the assistance of the *Cú Feasa*. During the spring, the *Cú Feasa* was also used for cruises with a tin-tow net (a device for collecting samples of plankton) in the Irish Sea with a view to locating the larvae of Dublin Bay prawns. The effect of using different mesh sizes on the size of the prawns captured was also investigated during the year. Reports on these investigations were submitted on the occasion of the meeting of the International Council for the Exploration of the Sea.

Trials were made of a small trawl for the common prawn (*Leander serratus*) in Cork Harbour.

Mussels:—A large-scale transplantation of mussels was undertaken in Castlemaine Harbour as part of a programme to rehabilitate the mussel fisheries of that area. Examination of the transplanted mussels indicated that they had grown well with a marked improvement in meat yield. The transplanted mussels have been protected against premature dredging by means of a bye-law of which details are given in Appendix No. 22.

General:—During the year advice was given by the Department's scientific staff to various interested bodies on matters relating to supplies of raw material for fish processing

A limited amount of hydrographical work was carried out and surface temperatures of sea water were taken twice daily at the Coningbeg Lightship.

The Inspector and Scientific Adviser with the Inspector and Engineer, accompanied by the architect to whom the design of the fishery research station to be erected at Galway has been entrusted, visited somewhat similar laboratories in Great Britain, the Netherlands and Norway.

INTERNATIONAL AND OTHER CONFERENCES.—

(1) International Council for the Exploration of the Sea.—The annual meeting of the Council, which was held in Copenhagen from 1 to 10 October, 1962, was attended by the Inspector and Scientific Adviser and one of the Assistant Inspectors. Prior to the meeting proper, a special meeting was convened to consider problems relating to the exploitation of commercially important species of crustacea, and the Inspector and Scientific Adviser also took part in this discussion. Officers of the Department contributed papers on Dublin Bay prawns (*Nephrops norvegicus*) and crawfish to the special meeting on crustacea and also presented papers on herrings, salmon, whiting and current measurements made from the Coningbeg and Daunt Lightships to the Herring, Salmon and Trout, Near Northern Seas, and Hydrographical Committees respectively. The Inspector and Scientific Adviser, who had completed his term of office as Chairman of the Consultative Committee was elected to the Bureau of the Council as a Vice-President; he was also elected Chairman of the Salmon and Trout Committee.

(2) PERMANENT COMMISSION ESTABLISHED UNDER THE INTERNATIONAL FISHERIES CONVENTION OF 1946.—At the tenth meeting of the Commission held in Hamburg in May, 1962, the Assistant Secretary in charge of fisheries and the Inspector and Scientific Adviser attended as delegates. They had also participated in a meeting of a Working Group under the chairmanship of Professor W. Cieglewicz (Poland), the Second Vice-President, which took place in Paris in April, 1962, to consider the steps necessary for regulating fisheries in which small mesh nets were permitted under the Convention. The Inspector and Scientific Adviser who, in his capacity of Chairman of the Consultative Committee of the International Council, acted as Chairman of the Liaison Committee (established to convey scientific information from the Council to the Permanent Commission) also attended several meetings of sub-committees on scientific matters.

(3) CHALLENGER SOCIETY.—This Society, which was established to foster an interest in oceanography, holds joint meetings with marine and other research laboratories from time to time in different parts of Great Britain and Ireland. In October, 1962, one of the Inspectors of Fisheries attended a joint meeting of the Society in Burnham-on-Crouch, Essex, at which problems relating mainly to shellfishes and their environments were discussed.

(4) ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT.—The Department kept closely in touch with the work of the Fisheries Committee of this Organisation and was represented at meetings held in Paris in July and October. The Committee's work is primarily aimed at the confrontation of national policies with a view to indicating fishery spheres in which co-ordination of Government action is feasible and desirable and also embraces surveys of the market situation for the main fishery products and the study of measures for assisting the fishery economies of developing countries.

ENGINEERING AND TECHNOLOGY.—Investigations begun in 1961 on the icing of fish and on fish temperatures from time of catch to time of retailing or processing were continued and a report, for distribution among fishermen, buyers and other parties, was in preparation at the close of the year.

Arrangements were made with the Institute of Fishery Products T.N.O. Ijmuiden, The Netherlands, for the services of one of their officials to demonstrate methods of hot smoking of fish in a special gas fired type of kiln. A pamphlet describing the method was circulated to interested parties. Commercial production of smoked mackerel and eels was undertaken successfully at Galway by a private concern.

Close co-operation was maintained between the engineering and biological staffs in investigations carried out by the exploratory vessel *Cú Feasa* on whiting, herring, nephrops, etc.

Laboratory accommodation for herring investigation at Dunmore East, designed in collaboration with the Office of Public Works, was provided at that port during the year.

Work carried out by the engineering staff included surveying and mapping of mussel producing areas in connection with the making of bye-laws, regulations, etc., and the preparation of maps and boundary definitions for the purpose of oyster fishery orders under the Fisheries (Consolidation) Act, 1959.

LEGISLATION.—The Fisheries (Amendment) Act, 1962, became law on 13 December, 1962. The main sea-fisheries provisions included are revision of the definition of "Irish sea-fishing boat" (section 19) and additional powers for the conservation of fish stocks and rational exploitation of fisheries (section 35).

Particulars of Statutory Instruments relating to sea-fisheries made during the year are included in Appendix No. 22.

PART II

INLAND FISHERIES

In 1962 the total catch of salmon by all methods was 2,863,868 lb., or more than double that of 1,345,653 lb. in 1961, and its value was £620,467 as compared with £410,381 for the preceding year. The catch of sea trout at 90,380 lb. valued at £15,034 was very slightly in excess of that of 1961 when 90,102 lb. valued at £14,648 were taken. The quantities and values of all salmon and sea trout taken in the years 1960, 1961 and 1962 are given in Appendix No. 11. As usual, these figures do not include the catches made in the Foyle area, part of which was formerly the Moville Fishery District. The Foyle catches are shown separately in the section of the report dealing with the Foyle Fisheries Commission (page 26).

During 1962 conditions as regards netting and angling were fairly uniform over most of the country. In the first four months of the year, conditions for angling were reasonably favourable in most districts but there were generally poor catches due to the meagre runs of small spring fish (those which had spent two years feeding in the sea). The runs of large spring fish (three years and upwards feeding in the sea), which probably were slightly better than in the previous few years, did not, however, compensate for the poor runs of the younger age group. In May and early June there was also a noticeable shortage of small summer fish. In consequence of these conditions, both commercial methods and rods gave poor results for the first five months of the year. The grilse runs started in good time and by the third week of June it seemed that they would compare well with those in previous years. By the beginning of July it was obvious that the runs of grilse were very large but, due to low water conditions, it was difficult to determine their extent. The low water prevailed in most areas until well into August but, by the time for closure of commercial fishing for salmon, large runs of grilse were still entering the estuaries of many rivers. The low water conditions prevented successful angling until near the end of the season in most areas. The overall picture for the year is that despite the poor catches of early running fish, the total weight of the catch of salmon and grilse in 1962 was more than twice that of either 1960 or 1961. It was apparent that a very high proportion of the total run was taken in many areas but there appears to have been an adequate escapement and the stocks of spawning fish were reputed to be exceedingly good in most areas.

This abundance of grilse was not confined to Ireland. It was experienced all over Great Britain, in parts of the Continent and in Canada. A consequence was that the price of grilse for the major part of the season was relatively low, as little as 1/6d. a lb. being obtained in some areas for good quality fish. Large quantities of grilse were also frozen for future sale.

Examination of the scales of fairly large numbers of the fish running in June, July and August showed that they were almost all grilse which had spent two years feeding in fresh water before going to the sea as smolts. They were, therefore, derived from the eggs deposited in the 1958/59 spawning season which hatched in the spring of 1959, becoming smolts in 1961. Another feature of the runs of 1962 was the very large size of some of the grilse. Genuine grilse, as determined by scale reading, were identified up to 13 lb. in weight. In consequence fishermen and merchants were frequently misled into believing that the runs in June and August contained a high proportion of fish of the older age groups.

The details of the catch in each Fishery District for the years 1960, 1961 and 1962 are given in Appendix No. 12. The catch of salmon in 1962 was distributed, as to the methods of capture, as follows:—

Draft nets	56.7%
Drift nets	21.2%
Rod and line	8.9%
Stake nets and other commercial methods not enumerated above	13.2%

The proportion of fish taken on rod and line showed a very marked decrease on that of the previous year although the actual catch at 257,579 lb. was higher than that in 1960 or 1961. The average weight of salmon and grilse taken on rod and line was 7.5 lb. which, despite the high proportion of grilse, was about the same as that in 1961, due to the high average weight of grilse towards the end of 1962.

A total of 9,030 rod licences were issued in 1962 compared with 8,578 in 1961. The average catch by rod and line throughout the country was 3.8 fish, weighing 28.6 lb. and valued at £8 5s. 0d. compared with 2.95 fish weighing 22.5 lb. valued at £7 11s. 7d. for the preceding year. The highest average weight for rod caught salmon (11.9 lb.) was in the Drogheda district in which the rod fishing takes place early in the year and is virtually completed before the grilse start to run. In western districts, viz., Galway, Connemara, Ballinakill, Bangor and Ballina, the average weight, as usual, was low because of the high proportion of grilse, which form the bulk of the catches in these districts.

While the catch of sea trout in 1962 by all methods was about the same as that of the previous year, the rod catch showed a slight decrease. The sea trout catch was distributed as follows:—

Rod and line	69.7%
Draft nets	26.0%
Other commercial methods ...	4.3%

The statistics are not in such a form as to give, for every district, a reliable guide to the catch per licence because there is no indication

of the numbers of licences taken for sea trout fishing as distinct from salmon fishing. In the Connemara district, however, which is the leading sea trout angling district, the returns showed that the average catch per licence was about 22 fish weighing 23 lb.

Along parts of the coast of Mayo, Sligo and Donegal the long-established drift net fishery by small boats experienced the best season for many years. Conditions were favourable during most of the short season and, in consequence of the heavy runs of grilse, catches were exceedingly heavy, being about three times those of the preceding season. The average weight was also relatively high at 6.9 lb. due, it is thought, to the high average weight of grilse in 1962. Fishing extended well into August in some centres.

The smolt runs in most rivers in 1962 were reputed to be better than average and, despite the low water during the summer and early autumn, mortality from all causes, including furunculosis, was comparatively low.

During the year officers of the Department made visits to salmon markets in Great Britain with a view to securing improved packing and grading of Irish salmon. In this work the Department has had the co-operation of the Fishmongers' Company in London, the various markets in Great Britain and the salmon merchants in the more important centres in England.

In 1962 the Corporation of Dublin Wholesale Fish Market handled 131,215 salmon and grilse weighing 934,788 lb., the highest recorded so far on this market, which provides the only Irish auction of salmon. Comparable figures were 42,316 fish weighing 303,883 lb. in 1961 and 45,424 fish weighing 340,841 lb. in 1960. The record number of over 8,000 fish were sold on the Dublin market on one day in 1962.

BOARDS OF CONSERVATORS.—Details of receipts and expenditure of Boards of Conservators in 1962 are given in Appendix No. 18 of this Report.

EMPLOYMENT IN THE INDUSTRY.—Exclusive of persons employed on the marketing and transport of fish a total of approximately 5,330 persons found either whole-time or part-time employment in inland fisheries during the year. The figure includes approximately 3,023 persons engaged in netting for salmon under common law right, 754 employed by Boards of Conservators on protection of fisheries over the open and closed seasons, 750 engaged in netting in Lough Foyle area or employed in that area as gillies or on protection work, 100 engaged in development work on behalf of the Inland Fisheries Trust and the remainder employed by proprietors of commercial salmon fisheries by fishery owners or by angling associations.

INSTRUMENTS OF CAPTURE.—The total number of fishing licences of all kinds issued during the year was 10,479, representing

an increase of 499 on the figure for 1961. The totals in recent years were —

1961	...	9,980
1960	...	10,059
1959	...	9,165
1958	...	11,053
1957	...	10,531
1956	...	10,135

The numbers of the various classes of licences issued in each fishery district during the year and the rates of licence duty are given in Appendices Nos. 19 and 20 respectively.

OFFENCES AGAINST THE FISHERY LAWS.—The number of prosecutions during 1962 was 178 as compared with 233 in 1961. The Garda Síochána continued to co-operate with Boards of Conservators in the protection of inland fisheries during the year.

SALMON EXPORTS.—The quantity of fresh, chilled or frozen salmon exported in 1962 was 18,834 cwt. valued at £658,480 as compared with 9,289 cwt. valued at £402,797 in 1961. These figures include landings of salmon in Co. Donegal from waters in the area administered by the Foyle Fisheries Commission. The average export price per cwt. was £34 19s. 3d. as compared with £43 7s. 3d. in 1961. Of the total quantity exported 15,083 cwt. went to Great Britain and 1,857 cwt. to France. In addition 135 cwt. of smoked salmon valued at £14,569 were exported in 1962—mainly to Great Britain, as compared with 143 cwt. valued at £15,212 in 1961.

The number of salmon exporters licensed under the Agricultural and Fishery Products (Regulation of Export) Act, 1947 (Export of Salmon) Order, 1954 (S.I. No. 275 of 1954), was 88.

DEVELOPMENT OF EEL FISHING.—Twenty-two temporary eel fishing authorisations were issued during the year. Proposals received for the erection of a number of new structures also were being examined.

In 1962, 2,038 cwt. of eels, valued at £33,772, were exported as compared with 1,869 cwt. valued at £25,678 in 1961 (which was not a good eel fishing year) and 3,212 cwt. valued at £40,562 in 1960.

The eel tagging experiments on the River Blackwater, Co. Meath, were continued in 1962 and extended to the Corrib system. The experiments, which are designed to provide information about the escapement of eels past the weirs, were not completed before the end of the year.

Experimental fishing for eels by means of fyke nets was carried out in the estuaries of the Carrick River, Co. Donegal, the River Laune, Co. Kerry, and the River Blackwater, Co. Cork. Fyke nets were used by fishermen fishing in Lady's Island Lake, Co. Wexford, with satisfactory results. This was the first occasion on which such nets were used by Irish fishermen.

Demonstrations of fish smoking techniques, including smoking of eels, were carried out in collaboration with An Bord Iascaigh Mhara. These successful demonstrations were given by a Dutch expert and were attended by representatives of all branches of the fishing industry. Further demonstrations were arranged, at the request of some of the participants, by An Bord Iascaigh Mhara in whose premises the smoking unit has been located. A comprehensive memorandum on smoking of fish, including smoking of eels, was being prepared.

During the year the prospects of extending eel exports to continental markets were investigated by Córas Tráchtála, at the Department's request. A survey of the British eel market was also carried out.

FISH CULTURE.—The demonstration fish farm units at Aherlow (Co. Tipperary), Enniscorthy (Co. Wexford), and Athenry (Co. Galway) continued to operate successfully during the year. The unit at Aherlow, which was extended in 1961, has met with increased demands for its products and the owner has been advised on methods to increase output and on further expansion. Water supply difficulties hindered operations at the unit at Ballymote (Co. Sligo). Work started on the construction of a further demonstration farm—a double unit—near Mullingar (Co. Westmeath).

Two small scale private units were constructed, one at Holycross (Co. Tipperary) and one at Jerpoint (Co. Kilkenny). These were stocked in October, 1962, and are making good progress. Information was given to persons interested in small scale fish farming and a number of sites were inspected.

Satisfactory progress was made in the construction of a commercial hatchery and fish farm near Waterville, Co. Kerry, by Rainbow Ltd., a company representative of Irish and Danish interests. Arrangements were made for stocking the hatchery in the 1963 season. Technical advice and assistance was given to a Belgian promoter in the planning of another commercial unit on the Milltown river near Dingle.

A project for rearing rainbow trout in seawater, planned by private interests, was the subject of further discussions with officers of the Department.

A preliminary meeting of rainbow trout producers was convened in October under the auspices of the Department with a view to setting up an association having as its primary objectives the maintenance of standards and the further promotion of the industry.

ARTIFICIAL PROPAGATION.—Details of salmon, sea trout and brown trout ova produced at the various hatcheries are given in Appendix No. 23.

The output of salmon ova in the 1962 spawning season amounted to 3,616,000 as compared with 5,250,000 produced in the previous season. 980,000 salmon ova were distributed from the Department's hatchery at Glenties and the State-assisted hatchery at Lismore, Co.

Waterford. 25,000 sea trout ova from Glenties were supplied to the Inland Fisheries Trust. The Trust released over 1,000,000 brown trout fry and fingerlings and 205,000 rainbow trout fingerlings in selected waters. In addition, 198,000 salmon fry and 12,000 sea trout fry were stocked in waters which were being improved by the Trust. 155,000 brown trout, almost half of which were summerlings and fingerlings, were sold to some twenty angling associations and 60,000 rainbow trout, mainly fingerlings, were sold to fish farmers.

REGULATION OF ERNE SALMON FISHERY.—Fishing for salmon by commercial methods was again suspended in 1962 until an escapement of 3,000 fish past Cathaleen's Fall dam was recorded on the counting apparatus maintained there by the Electricity Supply Board. Fishing was opened on 25 June when that escapement was recorded. The special local licence duty for draft nets was fixed at £25 and 8 licences were taken out.

The effects of the restrictions on commercial salmon fishing in the river in the 3 years 1960-1962 were being examined at the end of the year with a view to determining whether curtailment of fishing for a further period would be desirable in the interests of the fisheries.

SCIENTIFIC INVESTIGATIONS.—Ireland has participated since 1948 in a programme of salmon tagging in the open sea which was sponsored by the International Council for the Exploration of the Sea. Tagging of salmon taken by commercial drift-nets operating along the north coast of Co. Mayo was undertaken in 1962 by an officer of the Department assisted by an employee of the Salmon Research Trust of Ireland, Inc. Altogether 156 fish were tagged and 28 tags (17.9%) were recovered. Recaptures were made along the Irish coasts from the Kerry Blackwater, entering into Kenmare Bay, to Cushendun, Co. Antrim, and a single recapture from Angelholm on the south-west coast of Sweden, a minimum distance of approximately 1,100 miles from the tagging station. This is the longest distance recorded for any salmon tagged in Irish waters. A progress report upon these experiments was presented to the Salmon and Trout Committee of the International Council for the Exploration of the Sea at its annual meeting in Copenhagen and a note on the long-distance migration was published in *Nature*. A report upon the experiments previously conducted on salmon taken by drift-nets at Ardmore, Co. Waterford, was completed at the end of 1962 in readiness for publication.

During 1962, 2,063 kelts of salmon and grilse were tagged, mainly in connection with hatchery operations on the Rivers Ballisodare, Blackwater, Erne, Lee, Nore, Owenea and Shannon. A total of 64 recaptures were recorded, mainly of fish tagged in previous years. 94 sea-trout kelts were tagged in the River Owenea and 7 recaptures were recorded during the year.

Material, consisting of sets of salmon and grilse scales, with relevant data, was collected from the Rivers Corrib and Moy. A review

of the scientific work done on salmon in Ireland was in course of preparation during the year.

In 1959, a small lake, Lough Knader, joined by an artificial stream with the lake at Cathaleen's Fall on the Erne near Ballyshannon was treated with rotenone to destroy the existing fish population (trout, eels, perch and rudd). The lake was subsequently stocked with unfed salmon fry and the resulting smolts were trapped and tagged in 1961 and 1962. A report upon these experiments appears as Appendix No. 30 to this report. A short report on the results of tagging of salmon smolts conducted by the Department from 1952 to 1955 appears as Appendix No. 29 to this report.

The review of the scientific work done on sea-trout in Ireland referred to in the previous report was published in the *Scientific Proceedings of the Royal Dublin Society* during the year.

The studies of the age, growth and predatory habits of pike from western lakes, viz. Loughs Corrib and Mask, were continued, but the report upon the age and growth determinations of pike from scales and otoliths had not been completed at the end of the year. The trout stocks in a small lake in Co. Mayo which had been subjected to predation by a small number of male pike were kept under observation during the year.

A report on the trout and perch of Poulaphouca reservoir by one of the Assistant Inspectors was accepted for publication in the *Proceedings of the Royal Irish Academy*.

Further progress was made in the investigations on the River Moy into the effect of the drainage scheme on fish life. Chemical, biological and physical conditions at selected stations on the River Moy and its tributary, the Bunree, were investigated during the year. A graduate biologist awarded a studentship in November, 1961, to assist on this work resigned early in 1962 and it was not found possible to replace him until the end of the year.

An intensive survey of selected areas of the River Lee was carried out by officers of the Department in collaboration with officers of the Electricity Supply Board, the Inland Fisheries Trust and the Cork Board of Fishery Conservators in order to determine the cause of the decline in the salmon stocks of the river. The survey involved electrical fishing of selected tributaries, fin clipping of young salmon, operation of smolt traps, investigation of the food, age and growth of pike, etc. The survey is being continued in 1963.

As in 1961 fishing on the River Erne was curtailed to some extent in order to rehabilitate the salmon stocks of the river and one of the Assistant Inspectors of Fisheries spent a portion of the normal fishing season investigating the runs of fish into the river and their condition, etc.

Kelts found dead in a number of Irish rivers were again subjected to bacteriological examination. For the second year running the

incidence of disease in these fish was found to be small, unlike in Great Britain where the proportion has been reported to be relatively high. Two notes on this matter were published by one of the Assistant Inspectors during 1962 in *Nature*.

During the year officers of the Department kept the various farms for rainbow trout under observation and gave advice to the owners. Histological studies of the tissues of rainbow trout were initiated with a view to devising techniques for tracing diseases in farm reared fish.

As usual, sets of scales from the public were examined by officers of the Department who also gave evidence in a number of court cases in which expert evidence was needed. Material for examination and identification was also received from the Irish Specimen Fish Committee. Specimens of char, shad and rudd/bream hybrids were also examined.

Officers of the Department took part in the research programmes of the Foyle Fisheries Commission and at the close of the year the Inspector and Scientific Adviser prepared reports upon the salmon and sea-trout of the River Foyle in 1962 and on the results of the tagging programme which appeared as appendices to the Foyle Fisheries Commission's Report.

ENGINEERING.—*Electrical power stations*:—No new hydro-electric schemes were initiated during the year. Studies were continued on the effects of existing stations on fish life especially insofar as smolts are held up at dams or affected by turbines. Tests on the passage of smolts through the turbines at Carrigadrohid and Iniscarra on the River Lee were again confined to balsa wood fish shapes of smolt size under various conditions of head and load. Efforts were made by the Electricity Supply Board in collaboration with the Fisheries Division to evaluate the net smolt escapement, all the hazards of the non-tidal part of the river having been passed, to the tailrace at Iniscarra power station in the River Lee. For this purpose a smolt trap and a net spanning the whole width of the race were used. Very great difficulties were encountered due mainly to high discharges and there were no positive results during the year. In an effort to induce the smolts to enter the fish passes on their way downstream the Electricity Supply Board installed pump devices at Ardnacrusha on the Shannon and Carrigadrohid on the Lee. The possibility of further improvements at these sites is being studied.

Again, as in 1961, there was no report of stratification of water in the Iniscarra reservoir on the River Lee and the air bubble equipment there was not brought into use.

The improvement in the run of fish into the river Clady in 1961, where a new programme of river discharges to encourage fish movement had been introduced, was not repeated in 1962. It therefore became necessary to re-examine the position.

The projected new thermal power station at Great Island, Wexford, situated on the joint estuary of the Suir and Barrow was the subject

of consultation with the engineers of the Electricity Supply Board in so far as the fisheries may be concerned.

Arterial Drainage:—Drainage operations commenced on the following rivers: Broadmeadow, Co. Dublin; Deel, Co. Limerick; Killimor, Co. Galway. Major arterial drainage continued on the Corrib, Moy, Inny and Maine. Work under the Intermediate Drainage Scheme began on the river Ouvane, Co. Cork. This work is being executed by contractors and it has been found necessary to arrange that suitable clauses aimed at protection of fish life in the rivers concerned be prepared and included in the contracts. The examination of proposals in regard to the rivers Abbey, Co. Donegal, and Bunduff, Co. Sligo, was completed and the Office of Public Works was advised on the provisions required in the fishery interest. Particulars of drainage schemes for three further rivers, in the course of survey, design or preparation for execution have been received from the Office of Public Works and were being examined.

Fish passes:—ENNISTYMON, Co. Clare: The Limerick Board of Conservators was informed by the prospective contractor that he was unable to proceed with the construction of this pass. Accordingly, arrangements were made that the Board carry out the work by direct labour under the technical supervision of engineers of the Fisheries Division. The major part of the project had been completed by the end of the year. SWORDS, Co. Dublin: Three passes, one of a normal groyne type and two of a somewhat unusual design incorporated in a drop-weir structure were built as part of the Broadmeadow river-drainage scheme. DINGLE, Co. Kerry: A pass was built by the occupier of the milldam on the Milltown river. River BANDON, Co. Cork: Rock barriers which had hindered the passage of fish were removed. FOYLE AREA: The fish pass at Campsie weir on the River Faughan which, as reported for 1961, had been altered in accordance with recommendations of the Fisheries Division operated successfully; over 2,000 fish were counted passing through it by the fish counter installed in 1961.

Fish Counting:—SLIGO: The mechanical counter installed at the Sligo milldam functioned satisfactorily. GALWAY: It was found necessary to remove the counting tunnel from the pass in the Galway sluice barrage because of reluctance of salmon to pass through it, and to prepare a design for a new type of tunnel. A smolt trap was designed and installed at the sluice barrage and went into operation on an experimental basis from 28 March to 30 June during which period the fish taken in the trap, including 47,802 smolts, were counted and released again into the river. FOYLE AREA: In collaboration with the inventor of the apparatus used for counting the adult fish an electronic smolt counter of an experimental nature was installed at Mullaghmore weir on the Camowen river. It was not in position in time for trials with live fish during 1962, but tests with simulated smolts gave promising results.

Salmon Hatcheries:—The Galway Board of Conservators continued work on the salmon trapping, holding and hatchery installation at Cong, Co. Mayo under the technical supervision of the Fisheries Division. The project had reached an advanced stage of completion by the end of the year.

Salmon Research Trust:—Plans for additional fish trapping devices for migratory fish and associated facilities at Furnace, Co. Mayo, were prepared.

General:—Several proposals to abstract water from, or to discharge effluents into, rivers were referred to the Fisheries Division for examination. Complaints as to polluting effluents were also received. In all cases the matters were investigated and appropriate advice was given.

Mr. C. H. Clay, Chief Engineer, Pacific Area, Department of Fisheries, Canada, paid a visit to this country during the year. He visited a number of sites of fishery interest and discussed fishery problems with Irish workers in similar fields of activity.

FOYLE FISHERIES COMMISSION.—In common with many other Irish rivers the 1962 grilse season on the Foyle was the best for a great number of years. Net fishermen had a very successful season, notwithstanding the fact that the weekly close time had been extended from 48 hours to 72 hours so as to ensure adequate escapement of spawning fish. The very dry weather adversely affected conditions for angling particularly during June and July and when water conditions became suitable the fish were inclined to travel fast into the upper waters of the system. Particulars of catches by nets and rods, as published in the Commission's report, were as follows:—

	Salmon		Sea Trout		Total	
	Number	lb.	Number	lb.	Number	lb.
Nets ..	121,796	900,047	2,401	2,942	124,197	902,989
Rods ..	1,062	8,743	2,556	2,635	3,618	11,378
TOTAL ..	122,858	908,790	4,957	5,577	127,815	914,367

The following regulations were made during the year —

1. Foyle Area (Weekly Close Time) Regulations, 1962.
2. Foyle Area (Close Season for Angling) Regulations, 1962.

As part of its long term research programme the Commission carried out investigations and surveys under the following heads: (i) Escapement; (ii) Runs of adult fish; (iii) Smolt runs, including plans for counting the number of descending smolts in selected tributaries; (iv) Feeding potential of selected tributaries.

A total of 159,000 salmon fry was distributed in various rivers. 87 prosecutions were taken, 64 of them resulting in convictions.

A detailed review of the Commission's activities is published in its annual report for the year ended 30 September, 1962.

INLAND FISHERIES TRUST, INCORPORATED.—The five-year angling development plan financed by Bord Fáilte terminated during the year and a new five-year plan was inaugurated. Under the new plan all funds are derived from the Fisheries Vote, the grant-in-aid for 1962-63 being £63,000 and £75,000 for each of the next four years. In 1961-62 a grant-in-aid of £33,500 was provided while Bord Fáilte contributed £24,170.

To ensure integration of the Trust's development work with the promotional activities of Bord Fáilte a liaison committee composed of representatives of both bodies was established. This committee, on which the Department is represented by an observer, co-ordinates operations under a new five-year plan.

During the year development of game fishing, coarse fishing and sea angling resources was intensified as indicated more fully in the Trust's Annual Report.

Additional rearing stations at Mullingar and Cloncrim were operated successfully and pond space at Roscrea for brood stocks was increased. Imports of ova will, it is expected, be substantially reduced as a result. Predator reduction operations were continued and selected waters stocked with fry and fingerlings of salmon, sea trout, brown and rainbow trout. Fry and fingerlings were also supplied to small-scale rainbow trout producers.

In general satisfactory progress was made with the stocking of coarse fish but some difficulties were encountered in obtaining stocks of acclimatised brood carp. Stocks of bream were also in short supply. Experimental spraying was also undertaken in connection with the control of emergent weeds.

Surveys of sea angling centres continued with excellent co-operation of local associations and some biological investigations were undertaken to provide data on the habits of certain species. A start was also made on investigations to explore the possibility of extending the sea angling season to the winter months and the provision of combined sea and fresh water angling.

SALMON RESEARCH TRUST OF IRELAND, INCORPORATED.—Details of the Salmon Research Trust's activities will be found in the report of the Trust for the year 1962. The only addition to the Trust's installations was a smolt release pond from which tagged or fin clipped smolts can drop downstream naturally into the upper part of Lough Furnace. As in previous years incoming salmon and sea trout and the outgoing salmon and sea trout smolts and kelts and eels were controlled by means of a counting fence. Tagging of salmon and sea trout kelts and tagging and fin clipping of young salmon of known ancestry reared to the smolt stage was carried on during the year. Twelve recaptures were made of salmon which had

been reared in ponds and released in previous years either as tagged or fin clipped smolts or parr. All the recaptured fish had returned in the age group to which their parents belonged. Further experiments were made with feeding thyroid material to some of the young salmon and the results showed that earlier smoltification resulted.

Three university undergraduates were employed during the year as vacation research workers to investigate the fauna, and to remove brown trout and eels, in a smolt stream as a preliminary to a restocking experiment.

Investigations into the peat silt problem were carried on by the Trust under the direction of a sub-committee (The Peat Silt Research Group). A report by this Group appears as Appendix I to the Trust's report and details of the work of the biologist, seconded by the Department of Lands to the Trust, appear in Appendices II and III. A preliminary report on the hydrology of the Owenmore catchment area by the consultant engineer to the Group appears at Appendix IV. This aspect of Trust's work continues to be financed by Messrs. Arthur Guinness, Son & Co. Ltd., Bord na Móna and the Department jointly.

INTERNATIONAL AND OTHER CONFERENCES.—EUROPEAN INLAND FISHERIES ADVISORY COMMISSION.—This Commission held its second meeting in Paris during the period 7-13 May, 1962. Two officers of the Department represented this country at the meeting which was attended by delegates from fifteen other States and observers for three non-member countries. The matters discussed included pond fish culture and fish diseases, survey and appraisal of fishing waters and their fish population, water pollution study and control and implementation of the work of EIFAC.

Mr. M. J. Gallagher, former Assistant Secretary in charge of Fisheries Division, was re-elected chairman of the Commission for a further two-year period.

INTERNATIONAL CONFERENCE ON WATER POLLUTION RESEARCH.—This Conference was held in London during the period 3-7 September, 1962. Representatives from this country included two officers of the Department and one representative of the Salmon Research Trust. The Conference dealt with such matters of major interest as self-purification of freshwater streams and the effects of pollution on fisheries, treatment of sewage and industrial waste and the effects of pollution on the marine environment.

SALMON AND TROUT ASSOCIATION.—In October, 1962, the Inspector and Scientific Adviser, in collaboration with officials of the British Ministry of Agriculture, Fisheries and Food and of the Freshwater Fisheries Laboratory of the Department of Agriculture and Fisheries for Scotland, read papers on "Researches on the Atlantic salmon in Great Britain and Ireland" and on "Research on salmon in North America" at the annual conference of the Salmon and Trout Associa-

tion in London. He subsequently took part in the discussions which arose from consideration of the papers by the audience.

SALMON RESEARCH GROUP.—This group, established by the British Development Commissioners to consider research problems relating to the Atlantic salmon, accepted an invitation of the Minister for Lands to meet in Ireland in May, 1962. In collaboration with the Salmon Research Trust of Ireland, Inc., the Inland Fisheries Trust, Inc., the Office of Public Works and the Electricity Supply Board, arrangements were made for an inspection of the trout farm at Fanure, Roserea, the salmon rearing station at Parteen and the fish pass at Ardnacrusha on the Shannon, drainage and fishing installations on the River Corrib and the research installations at Newport, Co. Mayo. At the subsequent meeting officers of the Department introduced the main subject of discussion "*Salmon research and development in Ireland*".

The Inspector and Scientific Adviser, who acts as Director of Research to the Salmon Research Trust of Ireland, Inc., also attended a meeting of the Group in London in November, 1962, to consider "methods of augmenting smolt numbers". He communicated, *inter alia*, details of work undertaken by another officer of the Department and outlined in Appendix No. 30.

LEGISLATION.—The Fisheries (Amendment) Act, 1962, became law on 13 December, 1962. The main inland fisheries provisions included are substantial increases in penalties for fishery offences and in particular for those involving the use of poison or explosives for destruction or capture of fish ; revision of qualifications for membership of boards of conservators and of the procedure for election to boards ; extension and revision of procedure for making fishery bye-laws, and provision of power to impose controls on fishing for salmon at sea and on the landing of salmon caught at sea.

Particulars of Statutory Instruments relating to inland fisheries made during the year are included in Appendix No. 22.

BRIAN LENIHAN,
Parliamentary Secretary
to the Minister for Lands.

16 *September*, 1963.

APPENDICES TO THE REPORT ON SEA AND INLAND FISHERIES FOR THE YEAR 1962.

Appendices 11 to 17 are compiled from returns furnished by licence holders in pursuance of the Statistics (Salmon, Sea Trout and Eels) (No. 2) Order, 1945.

APPENDIX No. 1

Quantity and value of Sea Fish (excluding salmon) returned as landed in 1961 and 1962

Kinds of Fish	Quantity		Value	
	1962	1961	1962	1961
	cwt.	cwt.	£	£
Soles	3,495	3,112	57,440	47,684
Brill	2,058	1,851	21,026	18,720
Turbot	1,909	2,077	19,161	20,766
Plaice	19,357	21,298	173,187	175,826
Dabs	3,302	4,701	8,804	12,983
Megrims	2,670	2,548	8,884	8,696
Other Flat Fish	5,279	3,502	8,740	10,870
Ray/Skate	25,695	26,966	92,363	90,916
Cod	18,263	20,850	120,662	126,638
Haddock	8,868	12,051	56,352	63,703
Hake	3,041	3,035	24,014	18,322
Whiting	113,845	93,086	223,857	185,801
Pollack	10,103	8,654	31,938	23,826
Other Round Fish ..	12,225	8,972	20,119	16,160
TOTAL DEMERSAL ..	230,110	212,703	866,547	820,911
Herrings	187,534	250,078	260,463	209,710
Pilchards	5,169	2,259	2,223	865
Mackerel	16,475	24,007	39,297	38,238
Sprats	1,861	27,160	671	9,832
TOTAL PELAGIC ..	211,039	303,504	302,654	258,645
TOTAL WET FISH ..	441,149	516,207	1,169,201	1,079,556
	Nos.	Nos.		
Lobsters	296,800	318,985	115,097	101,615
Crawfish	86,975	134,388	56,962	58,372
Crabs	60,853	80,370	1,299	1,490
Escallops	743,427	300,979	12,624	5,390
Oysters	1,750,270	1,404,012	22,360	14,398
	cwt.	cwt.		
Dublin Bay Prawns ..	16,558	14,072	59,455	31,559
Mussels	6,308	14,919	3,086	7,187
Periwinkles	39,960	42,304	55,868	56,892
Other Shellfish	1,918	390	3,043	783
TOTAL VALUE SHELLFISH	—	—	329,794	277,686
TOTAL VALUE ALL FISH	—	—	1,498,995	1,357,242

APPENDIX No. 2

Comparison of the Average Prices per cwt. of various kinds of Sea Fish for the years 1955-1962

	1955	1956	1957	1958	1959	1960	1961	1962
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Soles ..	11 5 0	12 11 4	15 6 7	14 5 10	14 14 5	14 4 2	15 6 5	16 9 2
Brill ..	8 15 3	9 11 4	9 14 11	8 0 0	9 9 7	9 6 9	10 2 3	10 4 4
Turbot ..	7 18 9	9 15 3	9 2 0	10 7 1	9 16 2	10 2 2	10 0 0	10 0 8
Plaice ..	7 3 7	7 2 3	7 8 9	8 3 6	8 8 8	8 2 8	8 5 1	8 18 11
Dabs ..	—	—	—	—	—	—	*2 15 3	2 13 3
Megrims ..	—	—	—	—	—	—	*3 8 3	3 6 6
Ray/Skate ..	2 8 8	2 9 3	2 6 7	2 15 3	3 15 5	3 6 4	3 7 5	3 11 10
Cod ..	4 14 0	4 12 6	4 5 6	4 14 0	5 9 11	5 7 6	6 1 6	6 12 1
Haddock ..	2 0 2	2 5 5	2 2 0	2 17 1	3 5 5	3 16 3	5 5 8	6 7 1
Hake ..	4 17 6	5 17 11	4 17 0	6 9 7	6 19 7	7 12 7	6 0 9	7 17 11
Whiting ..	1 12 0	1 9 2	1 3 4	1 5 3	1 9 4	1 14 8	1 19 11	1 19 4
Pollack ..	—	—	—	—	—	—	*2 15 1	3 3 2
Herrings ..	0 15 3	0 14 9	0 14 10	1 1 3	1 3 8	0 18 11	0 16 9	1 7 9
Pilchards ..	—	—	—	—	—	—	*0 7 8	0 8 7
Mackerel ..	1 12 9	1 15 10	1 11 7	1 2 4	1 11 11	1 11 4	1 11 10	2 7 8
Sprats ..	0 4 2	0 10 0	0 5 6	0 6 8	0 7 8	0 13 0	0 7 3	0 7 2

N.B.—" Average price " as shown in this table represents total value divided by total weight for each kind of fish, year by year. It does not purport to take direct cognizance of any abnormal rise or fall in price attributable to a seasonal glut or shortage of a particular kind of fish.

* Comparable figures for years prior to 1961 are not available for these varieties.

APPENDIX No. 3

Value of Landings of Sea Fish (excluding salmon) at ports at which the value of such landings exceeded £20,000 in 1962

Port	Total Value	Demersal	Pelagic	Shellfish
	£	£	£	£
1. Castletownbere ..	211,673	176,031	16,775	18,867
2. Howth	175,283	168,897	1,180	5,206
3. Killybegs	152,063	87,944	62,754	1,365
4. Dunmore East ..	139,733	1,078	133,245	5,410
5. Dingle	76,071	58,275	2,930	14,866
6. Galway	59,324	49,693	2,138	7,493
7. Kilmore Quay ..	49,785	37,371	2,791	9,623
8. Dun Laoghaire ..	36,492	35,110	—	1,382
9. Cahirciveen	34,696	30,295	517	3,884
10. Skerries	34,250	8,026	—	26,224
11. Balbriggan	32,124	25,389	347	6,388
12. Burtonport	32,000	5,701	21,211	5,088
13. Clogherhead ..	31,559	19,074	30	12,455
14. Union Hall	25,493	20,168	582	4,743
15. Schull	21,158	16,170	1,917	3,071
16. Carna	20,539	603	80	19,856
17. Arklow	20,464	19,877	587	—

APPENDIX No. 4

IMPORTS AND EXPORTS OF FISH AND FISHERY PRODUCTS IN 1962

(as compared with 1961)

	Quantity		Value	
	1962	1961	1962	1961
I.—IMPORTS	cwt.	cwt.	£	£
Fish, fresh, chilled or frozen	20,044	23,315	133,046	115,521
Fish, cured—not in airtight containers	30,283	28,143	224,735	201,589
Fish and fish preparations in airtight containers ..	26,506	16,680	568,790	330,403
Other fish and fish preparations	5,053	3,582	76,187	49,023
TOTALS	81,886	71,720	1,002,758	696,536
II.—EXPORTS				
Fish, fresh, chilled or frozen :				
Salmon	18,834	9,289	658,480	402,797
Herrings	112,056	149,126	220,539	231,338
Fresh water eels ..	2,038	1,869	33,772	25,678
Other fish	8,534	8,199	56,339	62,684
Fish dried, salted or smoked not in airtight containers	58,241	23,986	176,216	85,613
Shellfish, fresh, chilled, frozen, salted, dried ..	59,807	56,434	440,588	381,488
Other fish and fish preparations	1,836	2,753	44,222	22,803
TOTALS	261,346	251,656	1,630,156	1,212,401

The figures given above for exports of salmon and trout include those relating to exports from the former Moville Fishery District now comprised in the Foyle Area.

APPENDIX No. 5

HERRING FISHING 1962

County	Ports at which more than 500 cwt. were landed	Total Quantity cwt.	Value £
Louth	—	—	—
Dublin ..	Howth	949	1,279
Wicklow ..	—	701	1,242
Wexford ..	Rosslare	1,428	1,944
Waterford ..	Dunmore East, Passage East	85,930	135,561
Cork	Kilcrohane, Castletownbere ..	3,630	7,790
Kerry	—	420	639
Clare	—	78	206
Galway ..	Galway	1,175	1,398
Mayo	Westport, Achill	14,183	14,530
Sligo	—	—	—
Donegal ..	Killybegs, Burton Port, Kincasslagh, Port and Inver, Bunbeg	79,040	95,874
	TOTALS	187,534	260,463

APPENDIX No. 6

MACKEREL FISHING 1962

County	Ports at which more than 250 cwt. were landed	Total Quantity cwt.	Value £
Louth	——	15	30
Dublin ..	——	89	225
Wicklow ..	——	—	—
Wexford ..	Kilmore Quay, Duncannon ..	1,259	4,056
Waterford ..	Passage East	970	2,036
Cork	Baltimore, Schull, Kinsale, Castletownbere, Ballycotton Union Hall	7,900	19,112
Kerry	Dingle	1,675	4,094
Clare	——	215	989
Galway ..	——	741	2,516
Mayo	Westport	2,281	3,836
Sligo	——	118	452
Donegal ..	Killybegs, Magheraroarty ..	1,212	1,951
	TOTALS ..	16,475	39,297

APPENDIX No. 7

REGIONAL DISTRIBUTION AND CLASSIFICATION OF FISHING CRAFT AND OF PERSONNEL ENGAGED IN FISHING IN 1962

Coast	How Engaged	Men	Total Vessels	Motor Vessels — Gross Tons						Boats propelled by outboard engines, sails or oars	
				75—120	50—74	25—49	15—24	10—14	Under 10	18′ Keel and upwards	Less than 18′ Keel
EAST (Omeath to Carnsore Point)	Solely	370	129	2	4	60	10	3	14	33	3
	Partially	262	91	—	—	—	1	1	13	68	8
	Laid-up		12	—	—	2	4	1	1	4	—
	Totals	632	232	2	4	62	15	5	28	105	11
SOUTH (Carnsore Point to Loop Head)	Solely	630	402	—	6	56	31	27	53	122	107
	Partially	1,053	147	—	—	—	—	17	39	28	63
	Laid-up		12	—	—	2	3	1	6	—	—
	TOTALS	1,683	561	—	6	58	34	45	98	150	170
WEST (Loop Head to Erris Head)	Solely	240	287	—	—	13	6	4	44	151	69
	Partially	1,437	373	—	—	—	—	1	37	146	189
	Laid-up		1	—	—	1	—	—	—	—	—
	TOTALS	1,677	661	—	—	14	6	5	81	297	258
NORTH (Erris Head to Moville)	Solely	386	322	—	3	29	5	3	96	173	13
	Partially	1,319	234	—	—	—	—	3	34	150	47
	Laid-up		3	—	—	2	—	—	1	—	—
	TOTALS	1,705	559	—	3	31	5	6	131	323	60
TOTALS (All Coasts)	Solely	1,626	1,140	2	13	158	52	37	207	479	192
	Partially	4,071	845	—	—	—	1	22	123	392	307
	Laid-up		28	—	—	7	7	2	8	4	—
	TOTALS	5,697	2,013	2	13	165	60	61	338	875	499

APPENDIX No. 8

TRAWLING AND SEINING 1962

Port or Locality	Number of men engaged	Number of boats engaged	Tonnage of Motor Boats			Fishing Period
			Not exceeding 10 tons	Over 10 tons	Over 15 tons	
Clogherhead	34	8	—	—	8	All year.
Balbriggan	34	7	—	—	7	All Year.
Skerries	38	8	—	—	8	All year.
Howth	100	20	—	—	20	All year.
Dublin	3	2	2	—	—	Autumn, Winter and Spring.
Dun Laoire	16	5	—	1	4	All year.
Arklow	90	19	—	—	19	All year.
Courtown	3	1	—	1	—	April to September.
Wexford	34	8	—	2	6	All year.
Rosslare	5	1	—	—	1	All year.
Kilmore Quay	53	12	—	4	8	All year.
Fethard-on-Sea	4	1	—	—	1	All year.
Bannow and Bar of Lough	6	2	2	—	—	October to April.
Duncannon	4	1	—	—	1	All year.
Ballyhack	10	3	3	—	—	August to November.
Passage East	12	3	—	—	3	All year.
Dunmore East	70	13	—	—	13	All year.
Helvick	15	3	—	—	3	All year.
Ballycotton	12	11	—	10	1	All year for one vessel. Autumn, Winter, Spring for remainder.
Cobh	12	4	3	1	—	All year.
Kinsale	8	4	—	4	—	All year.
Union Hall and Raheen	40	8	—	3	5	All year.
Schull	40	7	—	—	7	All year.
Castletownbere	45	8	—	—	8	All year.
Kilmackilloge	6	2	—	2	—	May to October.
Bantry	5	1	—	—	1	Spring and Summer.
Ballinskelligs	6	1	—	—	1	All year.
Cahirciveen	15	3	—	—	3	All year.
Dingle	75	15	—	1	14	All year.
Portmagee	20	4	—	—	4	All year.
Kenmare	2	1	—	1	—	All year.
Liscannor	4	2	2	—	—	All year.
Galway and Aran Islands	50	10	—	—	10	All year.
Roundstone	4	1	1	—	—	Spring and Autumn.
Cleggan and Inishbofin	20	5	3	2	—	All year.
Murrisk	4	1	—	—	1	All year.
Achill, Keel and Keam	32	8	4	—	4	All year.
Enniscrone	6	2	2	—	—	Spring, Summer and Autumn.
Killybegs	125	21	—	—	21	All year.
Burtonport	43	8	—	—	8	All year.
Kincasslagh	4	1	—	—	1	All year.
Downings	4	1	—	—	1	All year.
Buncrana	8	3	2	—	1	All year.
Glengad	35	11	9	2	—	January to October.
Greencastle	38	11	8	3	—	All year.
TOTALS	1,194	271	41	37	193	

APPENDIX No. 9

STATEMENT OF ACCOUNT IN RESPECT OF REPAYABLE ADVANCES

I. Advances of £408,500 made to the Irish Sea Fisheries Association, Ltd., during the period of twenty-one years to 23 April, 1952, for the provision of boats and gear :—

	£
Advances and interest thereon up to 31 March, 1960	566,255
Repayments made to 31 March, 1960	248,281
Amount determined for writing off (and actually written off in 1961-62)	186,000
Balance of advances to be repaid by a new annuity ..	131,974
	566,255
Instalments of new annuity to accrue up to 1972 ..	160,433
Instalments of new annuity :	
Repaid during year ended 31 March 1961	6,685
1962	13,369
Not accrued at 31 March, 1962 ..	140,379
	160,433

II. Advances of £63,215 made to Irish Sea Fisheries Association, Ltd., during the period of five years to 23 April, 1952, for purposes other than boats and gear :—

	£
Total repayments to be made, including interest ..	85,973
Repayments	
made to 31 March, 1961	41,536
made during year ended 31 March, 1962 ..	4,278
not accrued at 31 March, 1962	40,159
	85,973

III. Advances of £1,370,063 made to An Bord Iascaigh Mhara during the period of ten years to 31 March, 1962, for the provision of boats and gear and for other purposes :—

	£
Total repayments to be made, including interest ..	2,313,018
Repayments	
made to 31 March, 1961	387,588
made during year ended 31 March, 1962 ..	106,224
not accrued at 31 March, 1962	1,819,206
	2,313,018

APPENDIX No. 10

COASTAL EXTENT OF FISHERY DISTRICTS AND NAMES OF THE PRINCIPAL RIVERS IN EACH DISTRICT

District	Coastal Extent of District	Principal Rivers
No. 1 Dublin	Most easterly point on Red Island, Skerries, to Wicklow Head.	Liffey Vartry.
No. 2 Wexford	Wicklow Head to Kiln Bay, east of Bannow Bay, Co. Wexford.	Slaney Avoca.
No. 3 Waterford	Kiln Bay, east of Bannow Bay, to Helvick Head, Co. Waterford.	Suir Barrow Nore.
No. 4 Lismore	Helvick Head to Ballycotton Pier, Co. Cork.	Blackwater, Funshion, Bride, Awbeg.
No. 5 Cork	Ballycotton Pier to Crow Head, Co. Cork.	Lee, Owenboy, Bandon, Argideen, Ilen, Mealagh, Owvane, Coomhola, Glengarriff, Adrigole.
No. 7 Kerry	Crow Head, Co. Cork, to Kerry Head, Co. Kerry.	Roughty, Sheen, Finnihy, Blackwater, Sneem, Laune, Flesk, Maine, Caragh, Currane, Cummeragh, Inny.
No. 8 Limerick	Kerry Head, Co. Kerry, to Hag's Head, Co. Clare.	Shannon, Deel, Fergus, Mulcair, Little and Upper Brosna, Inny, Maigue, Feale.
No. 9[1] Galway	Hag's Head to the sea point of the boundary between the townlands of Keeraunagark Sth. and Banraghbaun Sth., Co. Galway.	Corrib, Claregalway.
No. 9[2] Connemara	The sea point of the boundary between the townlands of Keeraunagark South and Banraghbaun South, Co. Galway, to Slyne Head, Co. Galway.	Ballinahinch, Recess, Cashla, Owengowla, Invermore, Inverbeg, Screebe, Furnace.
No. 10[1] Ballinakill	Slyne Head to Pigeon Point, Westport Bay, Co. Mayo.	Culfin, Errif, Bundorragha, Dawros, Carrowniskey, Bunowen (Louisburgh).
No. 10[2] Bangor	Pigeon Point to Benwee Head, Co. Mayo	Newport, Burrishoole, Owenduff, Owengarve, Owenmore, Glenamoy.
No. 11 Ballina	Benwee Head to Coonamore Point, Co. Sligo.	Moy, Cloonaghmore (Palmerston), Easkey

District	Coastal Extent of District	Principal Rivers
No. 12 Sligo	Coonamore Point to Carrickgarve, Co. Sligo.	Ballisodare, Garavogue (Sligo), Bonet, Drumcliff.
No. 13 Ballyshannon	Carrickgarve to Rossan Point, Co. Donegal.	Erne, Bundrowes, Bunduff, Eske, Eaney Water, Oily, Glen.
No. 14[2] Letterkenny	Rossan Point to Malin Head, Co. Donegal.	Owenea, Gweebarra, Gweedore (Crolly), Clady, Lackagh, Lennon, Crana.
No. 17[3] Dundalk	Carlingford Lough to Clogherhead, Co. Louth.	Fane, Dee, Glyde.
No. 17[2] Drogheda	Clogherhead to the most easterly point on Red Island, Skerries, Co. Dublin.	Boyne, Blackwater, Deel.

Note—The area comprised in the former No. 14[2] or Moville District was, by the Foyle Fisheries Act, 1952, incorporated in the Foyle Area which is administered by the Foyle Fisheries Commission.

APPENDIX No. 11

Quantity and Value of all Salmon and Sea Trout taken in 1960, 1961 and 1962 by Instruments of Capture.

SALMON

Instruments	1962	1961	1960	1962	1961	1960
Total for all engines	lb. 2,863,868	lb. 1,345,653	lb. 1,364,292	£ 620,467	£ 410,381	£ 410,779
Total for rod and line	257,579	193,376	230,423	74,356	65,023	76,475
Total for drift nets	606,806	218,248	263,521	114,851	58,255	70,672
Total for draft nets	1,622,645	741,305	701,186	347,135	225,698	210,580
Total for stake nets, weirs, etc.	376,838	192,724	169,162	84,125	61,405	53,052

SEA TROUT

Instruments	1962	1961	1960	1962	1961	1960
Total for all engines	lb. 90,380	lb. 90,102	lb. 61,948	£ 15,034	£ 14,648	£ 10,712
Total for rod and line	63,034	64,127	43,363	9,701	9,608	3,701
Total for drift nets	1,437	1,188	1,263	274	266	250
Total for draft nets	23,442	22,955	16,244	4,622	4,399	3,505
Total for stake nets, weirs, etc.	2,467	1,832	1,098	437	375	256

This Appendix does not include returns from the former Moville Fishery District.

APPENDIX No. 12

Quantity and Value of Salmon taken in 1960, 1961 and 1962, by Fishery Districts.

Fishery District	*	Quantity			Value		
		1962 lb.	1961 lb.	1960 lb.	1962 £	1961 £	1960 £
Dublin	R	2,395	2,095	4,935	913	948	2,019
	N	8,672	2,741	5,455	1,862	926	1,837
Wexford	R	11,946	9,834	19,060	4,394	3,550	6,630
	N	21,643	19,596	25,145	7,544	7,885	10,028
Waterford	R	32,782	22,289	32,690	9,804	8,277	10,854
	N	359,643	133,362	138,314	63,856	40,959	39,256
Lismore	R	27,500	22,110	23,501	7,670	6,947	8,249
	N	249,589	95,806	117,086	49,561	31,570	35,836
Cork	R	17,462	9,404	14,737	5,653	3,498	5,159
	N	75,755	35,794	30,664	15,863	10,779	8,974
Kerry	R	29,881	21,396	27,862	7,967	6,760	8,241
	N	305,602	119,555	93,596	56,359	36,674	25,477
Limerick	R	43,469	37,436	35,973	13,894	12,943	11,902
	N	373,451	141,236	131,903	94,910	42,992	43,297
Galway	R	4,632	3,250	674	1,181	1,127	206
	N	57,762	20,455	42,275	13,653	6,184	14,402
Connemara	R	7,303	3,362	2,274	1,976	1,025	652
	N	Nil	Nil	Nil	Nil	Nil	Nil
Ballinakill	R	6,517	2,484	3,347	1,232	779	994
	N	48,477	12,454	14,310	7,861	2,828	3,003
Bangor	R	6,597	7,564	4,196	1,909	2,254	1,249
	N	143,098	58,328	56,422	27,480	14,041	15,194
Ballina	R	27,562	20,396	18,545	6,598	5,902	5,560
	N	397,668	256,283	195,173	87,900	73,675	57,800
Sligo	R	5,777	6,583	5,140	1,758	2,269	1,642
	N	85,023	44,773	39,402	19,926	12,655	9,625
Ballyshannon	R	6,951	3,812	4,436	1,493	1,351	1,507
	N	144,267	43,411	61,129	24,325	11,769	16,467
Letterkenny	R	13,220	12,145	14,349	3,087	3,571	4,072
	N	211,438	100,345	110,728	37,432	24,245	26,085
Dundalk	R	4,004	1,472	2,639	998	533	830
	N	51,365	23,599	24,358	10,945	7,507	7,349
Drogheda	R	9,581	7,744	16,065	3,829	3,289	6,709
	N	72,836	44,539	47,909	26,634	20,669	19,674
TOTALS		2,863,868	1,345,653	1,364,292	620,467	410,381	410,779

* R. indicates capture by means of single rod and line ; N by means of nets, weirs, etc.

APPENDIX No. 13

Quantity and Value of Sea Trout taken in 1960, 1961 and 1962, by Fishery Districts.

Fishery District	*	Quantity			Value		
		1962 lb.	1961 lb.	1960 lb.	1962 £	1961 £	1960 £
Dublin	R	2,421	1,098	1,244	428	214	206
	N	4,146	4,992	3,475	916	1,028	762
Wexford	R	2,242	2,006	1,421	420	293	214
	N	3,755	4,658	3,458	632	652	591
Waterford	R	526	932	963	134	135	142
	N	566	691	249	80	83	54
Lismore	R	1,346	749	642	262	100	51
	N	1,347	1,866	929	183	320	129
Cork	R	4,937	7,255	3,487	687	1,028	527
	N	374	961	178	58	169	27
Kerry	R	10,707	13,294	9,240	1,583	1,794	1,372
	N	2,777	1,647	1,397	459	377	293
Limerick	R	6,627	5,513	3,592	980	791	548
	N	8,311	4,956	5,300	2,006	1,278	1,489
Galway	R	1,751	1,568	574	268	262	109
	N	515	504	501	60	103	85
Connemara	R	11,679	12,765	8,275	1,718	2,018	1,328
	N	Nil	Nil	Nil	Nil	Nil	Nil
Ballinakill	R	4,870	3,305	2,281	722	473	380
	N	916	740	715	145	104	106
Bangor	R	5,578	7,250	3,406	838	1,106	517
	N	657	1,585	556	122	311	106
Ballina	R	1,287	1,220	2,068	222	240	325
	N	89	236	96	11	30	12
Sligo	R	545	262	274	85	46	48
	N	360	184	Nil	72	35	Nil
Ballyshannon	R	1,717	1,143	692	330	170	106
	N	497	513	272	53	84	36
Letterkenny	R	3,046	3,239	3,214	427	512	458
	N	442	393	240	63	57	39
Dundalk	R	2,107	650	579	325	103	101
	N	1,063	714	352	186	129	63
Drogheda	R	1,648	1,878	1,411	272	323	269
	N	1,531	1,335	867	287	280	219
TOTALS		90,380	90,102	61,948	15,034	14,648	10,712

*R. indicates capture by means of single rod and line : N. by means of nets, weirs, etc.

APPENDIX No. 14

Quantity and Value of Eels taken in 1960, 1961 and 1962, by Fishery Districts.

Fishery District	Quantity			Value		
	1962 lb.	1961 lb.	1960 lb.	1962 £	1961 £	1960 £
Wexford ..	Nil	4,563	1,864	Nil	610	176
Waterford ..	8,035	6,513	38,266	750	477	4,566
Lismore ..	160	220	Nil	12	21	Nil
Cork ..	Nil	1,800	Nil	Nil	80	Nil
Limerick ..	131,021	109,770	58,568	16,774	13,926	9,792
Galway ..	48,731	61,431	67,677	7,070	7,454	9,123
Ballina ..	3,373	7,937	36,340	501	943	3,770
Sligo ..	2,505	30,790	4,364	239	2,344	500
Ballyshannon ..	12,628	4,842	6,699	1,347	521	709
Dundalk ..	12,142	5,002	3,534	1,263	580	399
Drogheda ..	8,492	3,339	15,975	1,260	408	1,884
TOTALS ..	227,087	236,207	233,287	29,216	27,364	30,919

NOTE : The catch figures set out above are based on returns which are not complete. This explains any apparent inconsistency between the figures and the official export figures in any particular year.

APPENDIX No. 15

Total Quantity and Value of Salmon, Sea Trout and Eels taken by all engines in 1960, 1961 and 1962 by Fishery Districts.

Fishery District	Total Weight for District			Total Value for District		
	1962 lb.	1961 lb.	1960 lb.	1962 £	1961 £	1960 £
Dublin ..	17,634	10,926	15,109	4,119	3,116	4,824
Wexford ..	39,586	40,657	50,948	12,990	12,990	17,639
Waterford ..	401,552	163,787	210,482	74,624	49,931	54,872
Lismore ..	279,942	120,751	142,158	57,688	38,958	44,265
Cork ..	98,528	55,214	49,066	22,261	15,554	14,687
Kerry ..	348,967	155,892	132,095	66,368	45,605	35,383
Limerick ..	562,879	298,911	235,336	128,564	71,930	67,028
Galway ..	113,391	87,208	111,701	22,232	15,130	23,925
Connemara ..	18,982	16,127	10,549	3,694	3,043	1,980
Ballinakill ..	60,780	18,983	20,653	9,960	4,184	4,483
Bangor ..	155,930	74,727	64 580	30,349	17,712	17,066
Ballina ..	429,979	286,072	252,222	95,232	80,790	67,467
Sligo ..	94,210	82,592	49,180	22,080	17,349	11,815
Ballyshannon ..	166,060	53,721	73,228	27,548	13,895	18,825
Letterkenny ..	228,146	116,122	128,531	41,009	28,385	30,654
Dundalk ..	70,681	31,437	31,462	13,717	8,852	8,742
Drogheda ..	94,088	58,835	82,227	32,282	24,969	28,755
TOTALS ..	3,181,335	1,671,962	1,659,527	664,717	452,393	452,410

APPENDIX No. 16

Number, Quantity and Value of Salmon taken by Single Rod and Line in 1960, 1961 and 1962, by Fishery Districts.

Fishery District	No. of Fish			Quantity			Value		
	1962	1961	1960	1962	1961	1960	1962	1961	1960
				lb.	lb.	lb.	£	£	£
Dublin ..	315	221	529	2,395	2,095	4,935	913	948	2,019
Wexford ..	1,442	982	1,813	11,946	9,834	19,060	4,394	3,550	6,630
Waterford ..	4,164	2,534	3,805	32,782	22,289	32,690	9,804	8,277	10,854
Lismore ..	3,315	2,747	2,522	27,500	22,110	23,501	7,670	6,947	8,249
Cork ..	2,223	1,143	1,623	17,462	9,404	14,737	5,653	3,498	5,159
Kerry ..	4,248	2,974	3,761	29,881	21,396	27,862	7,967	6,760	8,241
Limerick ..	5,805	4,650	4,368	43,469	37,436	35,973	13,894	12,943	11,902
Galway ..	729	524	85	4,632	3,250	674	1,181	1,127	206
Connemara ..	1,057	553	337	7,303	3,362	2,274	1,976	1,025	652
Ballinakill ..	960	434	452	6,517	2,484	3,347	1,232	779	994
Bangor ..	922	1,364	530	6,597	7,564	4,196	1,909	2,254	1,249
Ballina ..	3,990	3,296	2,708	27,562	20,396	18,545	6,598	5,902	5,560
Sligo ..	810	940	627	5,777	6,583	5,140	1,758	2,269	1,642
Ballyshannon	971	494	548	6,951	3,812	4,436	1,493	1,351	1,507
Letterkenny	2,013	1,710	2,005	13,220	12,145	14,349	3,087	3,571	4,072
Dundalk ..	504	163	257	4,004	1,472	2,639	998	533	830
Drogheda ..	803	620	1,229	9,581	7,744	16,065	3,829	3,289	6,709
TOTALS	34,271	25,349	27,199	257,579	193,376	230,423	74,356	65,023	76,475

APPENDIX No. 17

Number, Quantity and Value of Sea Trout taken by Single Rod and Line in 1960, 1961 and 1962, by Fishery Districts.

Fishery District	No. of Fish			Quantity			Value		
	1962	1961	1960	1962	1961	1960	1962	1961	1960
				lb.	lb.	lb.	£	£	£
Dublin ..	2,421	1,234	1,466	2,421	1,098	1,244	428	214	206
Wexford ..	2,485	2,561	2,138	2,242	2,006	1,421	420	293	214
Waterford ..	663	1,093	1,204	526	932	963	134	135	142
Lismore ..	555	683	289	1,346	749	642	262	100	51
Cork ..	5,141	8,349	4,637	4,937	7,255	3,487	687	1,028	527
Kerry ..	8,404	9,902	7,952	10,707	13,294	9,240	1,583	1,794	1,372
Limerick ..	7,703	7,024	4,132	6,627	5,513	3,592	980	791	548
Galway ..	1,699	1,607	651	1,751	1,568	574	268	262	109
Connemara	10,868	13,928	8,849	11,679	12,765	8,275	1,718	2,018	1,328
Ballinakill ..	4,285	3,139	2,258	4,870	3,305	2,281	722	473	380
Bangor ..	5,750	7,174	3,801	5,578	7,250	3,406	838	1,106	517
Ballina ..	1,121	1,210	2,114	1,287	1,220	2,068	222	240	325
Sligo ..	448	212	341	545	262	274	85	46	48
Ballyshannon	1,117	1,041	648	1,717	1,143	692	330	170	106
Letterkenny	3,395	3,028	3,345	3,046	3,239	3,214	427	512	458
Dundalk ..	2,058	598	708	2,107	650	579	325	103	101
Drogheda ..	1,795	2,140	1,569	1,648	1,878	1,411	272	323	269
TOTALS	59,908	64,914	45,102	63,034	64,127	43,363	9,701	9,608	6,701

APPENDIX No. 18

PARTICULARS OF RECEIPTS AND EXPENDITURE OF BOARDS OF CONSERVATORS FOR THE YEAR ENDED 30 September, 1962

Fishery District	RECEIPTS						EXPENDITURE					
	Opening Balance	Licence Duty	Fishery Rate	Grant from Department	Miscellaneous Receipts	Total Receipts	Salaries	Water Keepers	Law Costs	Travelling and Miscellaneous	Total Expenditure	Closing Balance
	£	£	£	£	£	£	£	£	£	£	£	£
Dublin ..	— 97	1,806	269	800	470	3,345	1,196	404	27	1,564	3,191	+ 57
Wexford ..	+ 27	1,539	1,684	400	126	3,749	752	1,891	—	864	3,507	+ 269
Waterford ..	— 839	3,230	2,860	5,800	140	12,030	1,532	5,647	—	3,585	10,764	+ 427
Lismore ..	— 724	1,494	6,255	2,700	44	10,493	921	6,398	363	2,010	9,692	+ 77
Cork ..	+ 1,833	2,085	1,073	3,000	607	6,765	913	3,646	60	1,836	6,455	+ 2,143
Kerry ..	+ 2,113	2,436	2,732	1,800	240	7,208	1,163	4,264	124	1,543	7,094	+ 2,227
Limerick ..	+ 4,447	3,600	3,629	5,000	1,892	14,121	1,279	8,268	442	5,352	15,341	+ 3,227
Galway ..	+ 1,896	938	2,708	700	254	4,600	2,154	1,048	265	1,233	4,700	+ 1,796
Connemara ..	+ 59	678	1,832	—	10	2,520	235	1,613	—	394	2,242	+ 337
Ballinakill ..	— 342	537	942	800	75	2,354	368	1,351	147	500	2,366	— 354
Bangor ..	+ 613	1,047	1,442	700	521	3,710	1,018	1,578	40	1,029	3,665	+ 658
Ballina ..	— 72	1,029	3,390	—	204	4,623	659	3,462	27	868	5,016	— 465
Sligo ..	+ 592	633	1,000	—	93	1,726	400	801	20	509	1,730	+ 588
Ballyshannon ..	+ 411	1,074	568	3,504	92	5,238	676	2,899	—	1,482	5,057	+ 592
Letterkenny ..	+ 1,347	2,127	1,703	200	254	4,284	746	2,704	25	828	4,303	+ 1,328
Drogheda ..	— 131	1,506	1,549	2,200	65	5,320	681	2,602	—	1,571	4,854	+ 335
Dundalk ..	+ 277	674	263	1,200	39	2,176	348	923	117	646	2,034	+ 369
TOTALS ..	+ 11,360	26,433	33,899	28,804	5,126	94,262	15,041	49,499	1,657	25,814	92,011	+ 13,611

APPENDIX No. 19

PARTICULARS OF LICENCES ISSUED BY BOARDS OF CONSERVATORS FOR THE YEAR 1962

Fishery District	Salmon Rod								Special Local Licences (Tidal Waters)	Draft Net	Drift Net	Pole Net	Bag Net	Stake Net	Head Weir	Box or Crib	Loop Net	Snap Net	Gap Eye or Basket for Eels	Long Line for Eels	Oyster Dredge	Eel Trap
	Annual (all districts)	Annual (district of issue)	Late season (all districts)	Twenty-one day (all districts)	Seven day (all districts)	Late season (district of issue)	Foyle Area extension (one district)	Foyle Area extension (all districts)														
Dublin ..	324	58	31	—	51	38	—	1	—	11	23	—	—	—	—	—	—	—	—	—	—	—
Wexford ..	120	111	99	—	146	—	—	—	—	95	—	1	—	—	—	—	—	—	—	—	—	—
Waterford ..	99	664	6	1	47	10	—	—	—	13	93	—	1	3	—	3	—	123	25	—	—	—
Lismore ..	65	208	5	4	267	—	—	—	—	12	57	—	—	2	—	1	—	10	1	—	—	—
Cork ..	192	246	8	—	218	89	—	—	—	36	5	—	—	—	—	—	—	—	—	—	—	—
Kerry ..	149	242	—	1	515	210	—	—	—	58	—	—	1	—	—	3	—	—	—	—	10	—
Limerick ..	132	700	5	—	56	30	—	—	—	93	73	—	—	4	—	4	—	—	29	16	—	—
Galway ..	40	34	43	—	155	35	—	1	—	8	—	—	—	—	—	5	—	—	27	6	86	—
Connemara ..	8	15	3	—	362	113	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—
Ballinakill ..	9	13	12	—	201	78	—	3	—	14	—	—	—	—	—	—	—	—	—	—	—	—
Bangor ..	51	35	14	—	374	84	—	3	—	33	5	—	—	—	—	—	—	—	—	—	—	—
Ballina ..	31	104	2	—	153	36	—	—	—	13	52	—	—	—	—	7	—	—	42	—	—	—
Sligo ..	47	91	10	—	73	13	—	—	—	6	1	—	1	—	—	—	—	—	2	1	—	—
Ballyshannon ..	36	43	1	—	150	31	19	27	8	57	6	—	—	—	—	2	—	—	8	4	—	—
Letterkenny ..	42	290	7	2	177	130	109	22	13	40	48	—	—	—	—	2	28	—	2	—	—	—
Drogheda ..	171	115	1	—	29	14	1	3	—	77	—	—	—	—	—	6	—	—	2	2	—	16
Dundalk ..	47	57	2	—	—	49	27	13	—	23	—	—	—	—	—	—	—	—	22	1	—	—
TOTALS ..	1,563	3,026	249	8	2,974	960	156	73	21	589	363	1	3	9	—	33	28	133	160	30	98	16

APPENDIX No. 20

Licence Duties Payable on Fishing Engines

	£	s.	d.
On each Salmon Rod—Annual (valid all districts) ...	4	0	0
Do. Salmon Rod—Late Season (valid all districts)	3	0	0
Do. Salmon Rod—Twenty-one day (valid all districts)	3	0	0
Do. Salmon Rod—Seven day (valid all districts) ...	1	0	0
Do. Salmon Rod—Annual (valid district of issue only)	3	0	0
Do. Salmon Rod—Late Season (valid district of issue only)	2	0	0
Do. Salmon Rod—Foyle area extension (valid all districts)	2	10	0
Do. Salmon Rod—Foyle area extension (valid district of issue only)	1	10	0
On each—Draft net	4	0	0
Do. —Drift net	3	0	0
Do. —Snap net	2	10	0
Do. —Bag net	10	0	0
Do. —Stake net	30	0	0
Do. —Head Weir	6	0	0
Do. —Box or Crib	10	0	0
Do. —Gap, Eye or Basket for Eels	2	0	0
Do. —Long line for Eels	2	0	0
Do. —Coghill Net for Eels	2	0	0
Do. —Oyster fishing engine	2	0	0

Licence Duties Payable on Fishing Engines other than those Mentioned Above

Fishery District	Pole Net	Loop Net	Eel Trap	Special Local Licences	
				Rod	Draft Net
	£ s.	£ s.	£ s.	£ s.	£ s.
1. Dublin	2 0	—	—	—	—
2. Wexford	2 0	—	—	—	—
3. Waterford	2 0	—	—	—	—
4. Lismore	2 0	—	—	—	—
5. Cork	2 0	—	—	—	—
7. Kerry	2 0	—	—	—	—
8. Limerick	2 0	—	—	—	—
9. Galway	2 0	—	15 0	—	—
9*. Connemara	2 0	—	—	—	—
10[1]. Ballinakill	2 0	—	—	—	—
10[2]. Bangor	2 0	—	—	—	—
11. Ballina	2 0	—	—	—	—
12. Sligo	2 0	—	—	—	—
13. Ballyshannon	2 0	—	2 0	*3 0	*25 0
14[3]. Letterkenny	2 0	0 10	—	‡3 0	†12 10 ‡20 0
17[1]. Drogheda	2 0	0 10	2 0	—	—
17[2]. Dundalk	2 0	—	—	—	—

‡ River Lackagh Tidal Waters. * River Erne Tidal Waters.
† River Owenea Tidal Waters.

APPENDIX No. 21

PARTICULARS OF PUBLIC INQUIRIES HELD DURING 1962

Date of Inquiry	Where Held	Subject Matter	Decision on Report of Inquiry
16 April, 1962	Cromane, Co. Kerry.	To devise measures for the more effectual government, management, protection and improvement of the mussel fisheries in Castlemaine Harbour.	Bye-law made.
8 August, 1962	Kilrush, Co. Clare.	Application of Mr. John Malone, Ballyerra, Kilrush, for oyster bed licence.	Licence to be granted.
5 November, 1962	Cork	Application by Shannon Oyster Co., Ltd., of 72 St. Stephen's Green, Dublin, for oyster fishery order.	Order to be made.
12 December, 1962	Drogheda	Application for an alteration in close season for fishing for salmon and trout— (*a*) by nets in the tidal portion of the River Boyne and (*b*) by engines other than rod and line in the freshwater portion of the River Boyne.	No change.

APPENDIX No. 22

ABSTRACT OF STATUTORY INSTRUMENTS MADE IN 1962

ORDERS

Foyle Fisheries (Amendment) Act, 1961 (Commencement) Order, 1962 (S.I. No. 24 of 1962), dated 16 February, 1962,

APPOINTING 1 March, 1962, as the operative date of the Foyle Fisheries (Amendment) Act, 1961.

Live Fish (Restriction on Import) Order, 1962 (S.I. No. 39 of 1962), dated 2 March, 1962,

PROHIBITING the importation of live fish (with certain specified exceptions) and the eggs or young of such fish, save under licence.

River Erne (Special Local Licences) (Amendment) Order, 1962 (S.I. No. 111 of 1962), dated 25 June, 1962,

PROVIDING that the special local licence duty payable in respect of a draft net for use in the tidal waters of the River Erne shall be £25.

Fisheries (Amendment) Act, 1962 (Commencement) Order, 1962 (S.I. No. 216 of 1962), dated 20 December, 1962,

FIXING operative dates for the provisions of the Fisheries (Amendment) Act, 1962.

BYE-LAWS

Ballina District Bye-law No. 508, 1962, dated 30 March, 1962.

1. PROHIBITING in respect of the waters of the Castlebar lakes and their tributary and effluent streams—
   (*a*) angling in which any lure other than artificial fly is used ;
   (*b*) the taking of brown trout of less than ten inches in length and the taking of rainbow trout of less than eleven inches in length ;
2. PRESCRIBING that, in any one day, a person shall not take from these waters nor have in his possession in any place on or near these waters more than six brown trout or more than four rainbow trout.

Ballyshannon District Netting Bye-law No. 509, 1962, dated 25 June, 1962.

PERMITTING the use of draft nets not exceeding 85 yards in length for taking salmon or trout during the period from 25 June to 19 August, 1962, in the portions of the tidal waters of the River Erne and Abbey River as specified in the bye-law, notwithstanding the prohibitions contained in Ballyshannon District Bye-law No. 503, 1960.

Castlemaine Harbour Mussel Fisheries Bye-laws No. 510, 1962, dated 14 September, 1962

PROVIDING for the culling of mussels taken from Castlemaine Harbour and the returning of undersized mussels to the mussel beds ;

SUSPENDING mussel fishing in specified parts of that harbour during the periods 1 October, 1962, to 30 September, 1963, and 1 October, 1962, to 30 September, 1964.

APPENDIX No. 23

OUTPUT OF OVA IN 1961/62

	River system stocked	Salmon ova ('000)	Sea Trout ova ('000)	Brown Trout ova ('000)
Lismore ..	360,000 ova to hatching stations throughout the State, remainder to Blackwater	370	—	—
Mallow ..	River Blackwater and tributaries	900	—	—
Inistioge ..	River Nore and tributaries ..	50	—	—
Loughrea ..	Lough Rea	—	—	20
Parteen ..	Shannon	568	—	—
Lough Owel ..	Various Trust Waters, principally Loughs Owel, Ennell, Derravarragh	—	—	1,030
Fanure ..	Various Trust Waters ..	200	—	—
Oughterard ..	Lough Corrib and tributaries and River Suck System ..	—	—	539
Inver ..	Inver River System	—	73	—
Screebe ..	Screebe River	77	90	—
Ballisodare ..	Ballisodare River and tributaries	80	—	—
Ballyshannon	Erne	697	—	—
Lee ..	Lee	23	—	—
Glenties ..	620,000 salmon ova distributed to hatching stations throughout the State ; remainder to Rivers Owenea and Owentocker. All sea trout supplied to Inland Fisheries Trust and fry released in Trust Waters	651	25	—
	TOTALS ..	3,616	188	1,589

APPENDIX No. 24

LIST OF SCIENTIFIC AND OTHER PAPERS BY OFFICERS OF THE FISHERIES DIVISION PUBLISHED DURING THE YEAR 1962 (OTHER THAN THOSE APPENDED TO THIS REPORT)

GIBSON, F. A., "Notes on *Brama raii* (Bloch) from Galway Bay." *Irish Nat. Jour.* xiv, 15-18.

HEWETSON, A., "Furunculosis in salmon kelts." *Nature.* 194, 312. (21/5/62).

————————"Furunculosis in salmon kelts." *Nature.* 196. 1009. (8/12/62).

MORIARTY, C. "Movement of salmon." *Nature.* 196. 595. (10/11/62).

O'RIORDAN, C. E., "Further notes on *Urophycis blennoides* (Brunnich), the greater forkbeard, off the south and southwest coast of Ireland." *Irish Nat. Jour.* xiv, 40-42.

WENT, A. E. J., "Rare fishes taken in Irish waters in 1961." *Irish Nat. Jour.* xiv, 33-35.

————————"Irish sea trout. A review of investigations to date." *Sci. Proc. R. Dublin Soc. Ser. A.* 1. 10. 265-296.

————————"Historical notes on the oyster fisheries of Ireland." *Proc. Roy. Irish Acad.* 62. C. 7.

WENT, A. E. J. with F. T. K. Pentelow and K. A. Pyefinch, "Researches on the Atlantic Salmon in Great Britain in Ireland." Salmon and Trout Association, London Conference 1962.

————————"Researches on salmon in North America." Salmon and Trout Association. London Conference 1962.

APPENDIX No. 25

HERRING INVESTIGATIONS AT DUNMORE EAST — 1962/63

By

JOHN BRACKEN, PH.D., (Assistant Inspector)

Fishing commenced on 22 October, 1962, and finished on 30 January, 1963. Fifty-eight Irish based boats using four types of gear (vinge and larsen trawls, ring nets and purse-seines) took part and landings were made on 52 days out of a possible 68. Altogether, 25,370 crans were landed by Irish based boats during the season, a decrease of 3,750 crans, or approximately 12.9% on the figure for 1961/62. Whereas in previous seasons ring-netting produced the major portion of the landings before Christmas and thereafter trawling contributed most, during the 1962/63 season trawl catches were higher throughout the season as ring-netting was engaged in to a lesser extent and accounted for only 1,821 crans.

Samples of herrings were obtained from 17 November to the end of the season. These samples were examined for length, sex, maturity, vertebral count, age (both scales and otoliths) and racial type. Fish numbering 1,739 were examined in this way and the monthly age distribution obtained is shown in Table 1. The dominant age groups were found to be 5-year and 3-year olds. The 1957 year class which entered as the main recruit brood during the 1960/61 season was a very strong one. This year class was dominant during the 1961/62 season and again during the 1962/63 season as 5-year olds. Recruitment was below normal during the 1962/63 season.

The maturity stages were similar to these of the previous two seasons. In November and December the gonads were developing (mainly stage V) becoming full in January (stage VI). A small percentage of spents was present in the catches throughout the season. The large fulls which occurred in October during the previous few seasons were not located during 1962/63 and the main fishing season was consequently later.

Summary of the mean length and mean vertebral count per maturity stage per age class is shown in Table 2. The mean vertebral count of the 2-, 3- and 4-year olds is typical of winter spawners.

The position and extent of the fishery in 1962/63 was much different from the pattern which had obtained since 1958. Prior to 1962/63 the shoals were generally first located in Baginbun Bay close to the shore, in 10 fathoms. Estuarine fishing became prominent by mid-November and continued until mid-December. After Christmas, fishing was usually confined to Baginbun Bay. In the 1962/63 season, however, estuarine fishing lasted only two weeks. Fishing was later confined to an area south-west of the Hook. In January the shoals had moved further offshore in a westerly direction and were taken in 30 to 36 fathoms off Mine Head.

TABLE 1—Monthly Age distribution for 1962/63

Age in years	2	3	4	5	6	7	8	9	10	10+	Totals
November ..	84	224	171	169	50	16	16	8	1	1	740
December ..	36	157	132	272	60	19	40	29	14	22	781
January ..	1	50	46	84	10	1	13	5	4	4	218
TOTALS ..	121	431	349	525	120	36	69	42	19	27	1,739

TABLE 2—Mean length in centimetres and mean vertebral count per maturity stage per age class

Age in years	2	3	4	5	6	7	8	9	10	10+	Total No. of Fish
Maturity Stage											
I. ..	1 21.30 58.00										1
II.	92 23.67 56.69	3 26.43 57.00									95
III. ..	1 23.20 56.00	1 23.50 57.00									2
IV. ..	1 24.00 57.00		2 26.35 56.50								3
V. ..	19 23.73 56.58	344 25.88 56.97	232 57.07 56.84	402 27.89 56.83	86 28.90 56.60	31 29.55 56.64	48 29.75 56.94	33 29.93 57.03	13 29.96 57.08	23 30.09 57.04	1,231
VI. ..	2 23.65 56.00	63 26.02 57.08	84 27.11 56.80	98 27.98 56.82	16 28.79 56.69	4 29.60 56.75	20 30.08 57.15	8 30.10 57.00	5 30.02 57.40	4 30.50 56.75	304
VII. ..	9 23.98 56.60	20 25.95 56.75	31 27.10 56.74	25 27.88 56.76	18 28.71 56.61	1 29.60 56.00	1 29.70 56.00	1 30.00 56.00	1 30.10 57.00		103
TOTALS ..	121	431	349	525	120	36	69	42	19	27	1,739

APPENDIX No. 26

PRELIMINARY HERRING INVESTIGATIONS IN DONEGAL BAY, 1962

By

JOHN BRACKEN, PH.D., (Assistant Inspector)

Samples of herrings landed at Killybegs from 14 May to 5 October, 1962, were examined for length, sex, maturity, age and racial type. As the quantities landed during this period were small and as the main herring season did not commence until 11 October, the results obtained may not be fully representative of the existing stocks. At least two distinct races were identified, the majority (59%) being

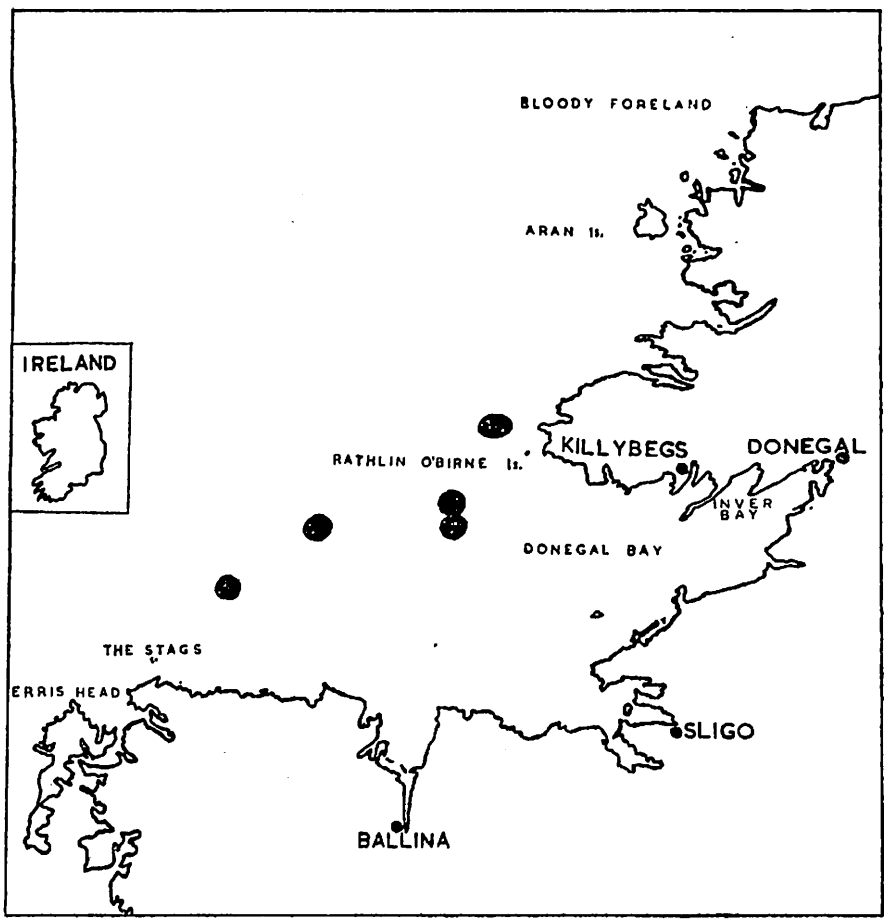

FIG. 1

autumn spawners while the remainder (41%) were a mixture of winter and spring spawners. Further separation of the winter and spring spawning types was not carried out. The monthly age distribution of the autumn and winter/spring types is shown in Table 1.

TABLE 1—Age distribution per month

	AUTUMN COMPONENT											WINTER COMPONENT											
No. of Winter Rings ..	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
May	8	23	14	1	—	2	—	—	—	—	—	—	13	40	75	23	42	46	31	30	31	7	1
June	1	21	41	15	3	9	1	1	—	1	—	—	—	13	59	17	11	12	12	6	4		1
July	12	43	167	50	36	61	41	36	7	5	2	—	10	61	56	10	19	33	10	12	20	2	—
August	14	73	134	31	9	24	16	10	3	1	—	—	2	32	54	13	—		1	1			
September	5	12	5	—	1	1	—	—	—	—	—	—	33	29	10	1	—	1	1	—			
October	35	142	223	71	77	91	49	32	18	2	1	1	50	54	50	21	25	21	23	11	8		
TOTALS ..	75	314	584	168	126	188	107	79	28	9	3	1	108	229	304	85	97	113	78	60	63	9	4

The dominant year classes in the autumn spawning group were the 5-year and 4-year olds but the 8-year and 6-year olds were also well represented. Similar dominant year classes were found in the winter/spring group where the 3-year and 7-year olds were also prominent.

As all the fish examined were trawl-caught herrings and lacked scales, it was not possible to calculate the growth after one year (L. distribution) for any of these fish. The age distribution and racial type of these herrings were determined by an examination of the otoliths and confirmed by other meristic characters such as the numbers of vertebrae and the maturity of the gonads. The mean length and mean vertebral count per maturity stage per age class per racial type is summarised in Table 2.

All stages of maturity were found. Monthly totals per age class per maturity stage (details not given in this paper) showed that in May the autumn spawners were mainly in stage VIII (recovering spents) and stages II and III (maturing virgins). During June and July the majority of these fish were in stage V (full) with some in stage VI (running) and by the end of October these fish were mainly in stage VII (spent). The winter/spring spawners showed a much slower rate of development and were mainly in stage V during October.

The major portion of the landings from Donegal Bay took place after these preliminary investigations had ended in October, 1962. Each season the main landings occur only after the autumn spawning has been completed. All attempts to locate the autumn spawners in stages IV and V in previous seasons failed and only sporadic landings were made before October. The fish landed during these investigations were taken as shown in Fig. 1. In May catches were recorded 3 miles south-east and 8 miles north-west of Rathlin O'Beirne. Several catches were made 11 miles east-north-east of the Stags (Fig. 1) in June in 45 fathoms. In July and August several landings were made from deep water 26-28 miles off Rathlin O'Beirne. In September catches were recorded north of the Stags.

Immature Herrings from Donegal Bay. Two samples of immature herrings taken by trawl, close to the shore off St. John's Point, on 6 July and 2 August were examined. The age distribution in these two samples has been combined in the following table:—

Age in years	1	2	3	4	No reading	Total
Nos. of Fish ..	3	619	21	1	56	700

The 2-year old fish fell into two groups, 416 being of the autumn spawning group (mean vertebral count 56.48) and 203 of the winter/spring spawning group (mean vertebral count 56.77).

TABLE 2—Mean length and mean vertebral count per maturity stage per age class per racial type

No. of Winter Rings / Maturity Stages	1	2	3	4	5	6	7	8	9	10	11	12
AUTUMN COMPONENT												
I.–III.		(26) 25.89 56.54	(37) 26.27 56.40	(17) 27.43 56.29	(2) 28.30 56.50							
III.		(8) 25.75 56.25	(32) 27.55 56.47	(70) 28.76 56.40	(26) 29.64 56.08	(19) 30.66 56.26	(26) 31.09 56.15	(12) 31.12 56.08	(10) 31.19 56.10	(5) 31.16 56.20	(4) 31.55 56.50	
IV.		(14) 26.61 56.36	(55) 27.95 56.38	(170) 28.86 56.49	(47) 29.76 56.40	(23) 30.65 56.52	(45) 30.98 56.49	(25) 31.10 56.36	(26) 31.45 56.42	(1) 31.50 56.00	(2) 31.50 56.00	(2) 31.25 57.00
V.		(10) 26.23 56.40	(45) 28.01 56.58	(104) 28.74 56.51	(22) 29.62 56.23	(7) 30.40 56.14	(26) 30.88 56.58	(21) 31.12 56.24	(11) 31.68 56.36	(4) 32.12 56.75	(1) 29.70 56.00	
VI.		(2) 27.15 57.00	(34) 27.77 56.53	(45) 29.03 56.62	(11) 29.81 56.64	(30) 31.13 56.50	(32) 31.19 56.78	(6) 31.35 57.00	(5) 31.50 56.40	(2) 32.15 56.00		
VII.		(14) 26.22 56.57	(91) 27.90 56.54	(153) 28.89 56.46	(48) 29.72 56.31	(38) 30.73 56.47	(44) 31.13 56.43	(39) 31.49 56.36	(24) 31.43 56.33	(12) 31.57 56.50	(2) 31.85 56.50	(1) 33.50 57.00
VIII.		(1) 27.50 57.00	(20) 27.67 56.50	(25) 28.60 56.44	(12) 29.74 56.58	(9) 30.75 56.78	(15) 31.05 56.67	(4) 31.05 56.75	(3) 31.40 56.67	(4) 31.60 56.00		
Nos. of Fish		(7)	(314)	(584)	(168)	(126)	(188)	(107)	(79)	(28)	(9)	(3)
WINTER COMPONENT												
I.–III.	(1) 23.00 57.00	(51) 25.26 56.74	(45) 24.99 56.67	(33) 27.17 56.85	(1) 27.20 56.00							
III.		(9) 26.05 56.55	(44) 27.57 56.79	(76) 28.43 56.87	(14) 30.01 56.57	(20) 30.40 56.75	(30) 31.02 56.83	(13) 31.06 56.77	(11) 31.48 56.91	(7) 31.54 56.86	(2) 32.35 57.00	
IV.		(20) 25.90 56.40	(62) 27.69 56.72	(42) 28.83 56.86	(14) 29.96 56.93		(1) 32.40 57.00	(1) 31.60 57.00	(1) 30.90 57.00	(13) 31.68 56.77		
V.		(27) 26.04 56.74	(70) 28.00 56.63	(56) 29.04 56.71	(21) 30.28 56.62	(25) 31.20 56.44	(21) 31.07 56.38	(24) 31.80 56.58	(11) 31.77 56.64	(8) 31.54 56.25		
VII.			(1) 27.80 57.00	(7) 28.48 56.57	(1) 29.90 56.00	(7) 30.73 56.86	(5) 30.54 56.40	(8) 31.25 56.37	(5) 30.92 56.60	(7) 31.21 56.71		
VIII.		(1) 26.10 57.00	(7) 27.58 56.55	(90) 28.74 56.79	(34) 29.43 56.56	(45) 30.35 56.75	(56) 30.90 56.61	(32) 31.10 56.72	(32) 30.96 56.72	(28) 31.15 56.39	(7) 31.34 56.57	(2) 32.55 57.50
Nos. of Fish	(1)	(108)	(229)	(304)	(85)	(97)	(113)	(78)	(60)	(63)	(9)	(2)

Figures in brackets represent the numbers of fish. Figures on the left in each column represent the mean lengths in cm., while those on the right represent the mean vertebral counts.

APPENDIX No. 27

THE ACHILL HERRING FISHERY 1962

By

JOHN BRACKEN, PH.D., (Assistant Inspector)

The presence of a small inshore fishery for autumn spawning herring in the neighbourhood of Clare Island and Achill Island, off the west coast of Mayo (see Fig. 1), was recorded by Farran (1946). During the period 1941 to 1959, landings from this fishery did not exceed 1,500 crans per season with the exception of 1947 (see Fig. 2). In 1960, 1961 and 1962, however, the landings were 7,500, 3,300 and 3,000 crans, respectively.

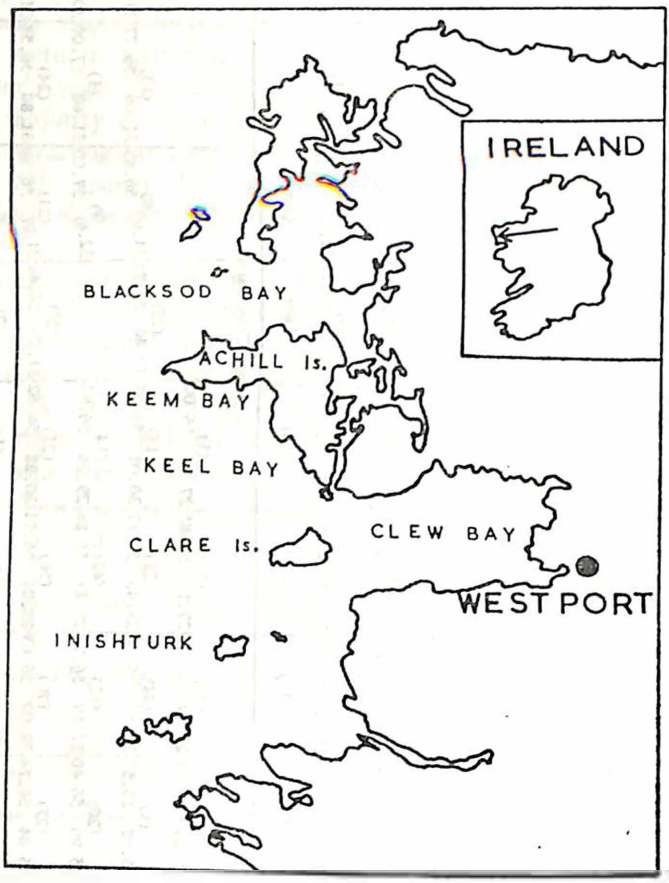

FIG. 1

In 1962, fishing commenced on 12 September and continued with fairly regular landings until 12 October. Nineteen boats took part and landed their catches at Westport. The following types of gear were used:

(a)	Ring-nets	13
(b)	Mid-water trawls ...	6

TABLE 1—Mean length and mean vertebral count per maturity stage per age class

Year Brood	1959	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	TOTALS	
No. of Winter Rings	2	3	4	5	6	7	8	9	10	11	12		
Maturity Stage : IV.	—	—	—	1 32.10 57.00	1 32.00 57.00	—	1 31.80 56.00					Nos. 3	% 0.4
V.	14 26.90 56.71	77 28.74 56.45	173 29.65 56.49	106 30.26 56.42	76 31.22 56.42	68 31.22 56.47	32 32.00 56.56	19 31.94 56.58	5 31.60 56.60			570	82.00
VI.	1 26.80 57.00	6 28.32 56.33	11 29.47 56.46	10 30.16 56.70	7 31.14 56.33	4 31.20 56.25	3 32.26 56.33	—	2 31.75 56.50	—	1 32.70 56.00	45	6.5
VII.	10 26.52 56.60	4 28.25 57.00	41 29.33 56.61	7 29.78 56.43	2 31.30 56.50	3 32.07 56.00	1 32.10 57.00	2 31.75 56.50	1 31.60 57.00	—		71	10.0
VIII.	1 25.10 57.00	1 27.00 57.00	2 29.00 57.00	1 28.70 57.00	1 32.00 56.00	1						6	0.9
TOTALS	26	88	227	125	87	75	37	21	8	—	1	695	100.0

TABLE 2—Length distribution in half-centimetre groups

Length in Half-Centimetres	25.0	25.5	26.0	26.5	27.0	27.5	28.0	28.5	29.0	29.5	30.0	30.5	31.0	31.5	32.0	32.5	33.0	33.5	34.0	Total
Nos. of Fish	1	1	10	7	15	8	36	52	93	93	89	86	78	62	43	12	7	1	1	695

Of the total quantity of herrings landed the ring-nets accounted for 2,400 crans (80%).

Samples of ring-net caught herrings were examined at Westport during September, 1962, for length, sex, maturity, age and racial type. The dominant ages recorded were 5 and 6 year olds. Over 82% of the fish examined were in a pre-spawning condition (Stage V), 6.5% were running (Stage VI) and 10% were spent (Stage VII) —see Table 1. With the exception of the 1959, 1952, 1951 and 1949 year classes, where the numbers of fish examined were low, it will be seen that the vertebral counts of the year broods in Stage V are those of typical autumn spawning herring and there is no evidence of any admixture of stocks.

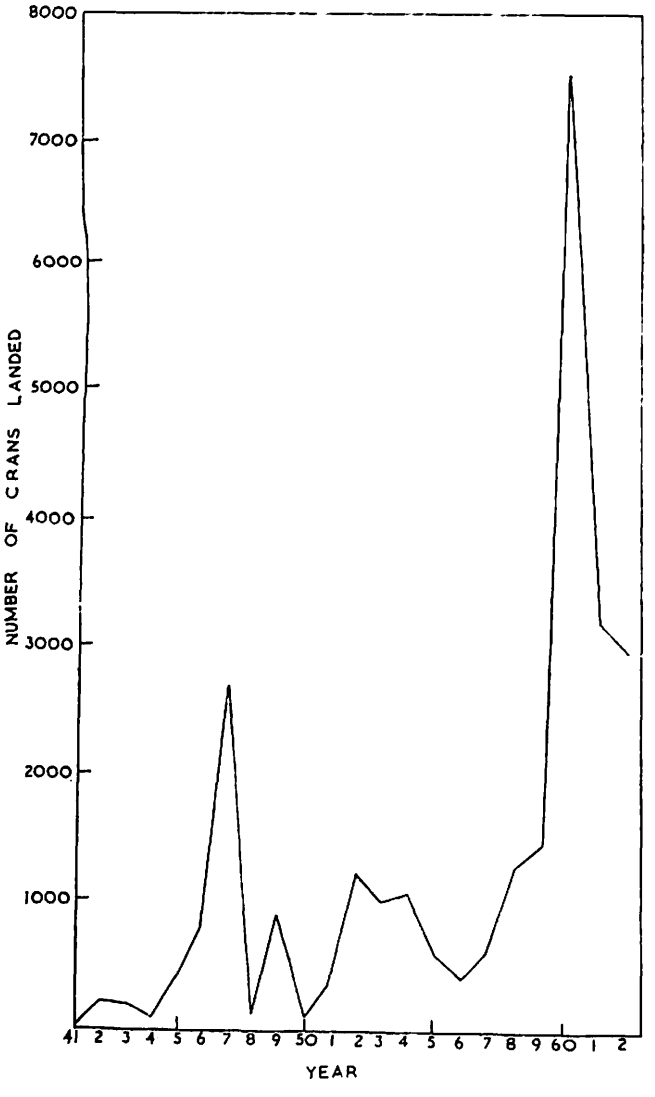

FIG. 2

TABLE 3—L_1 distribution

Age in years	Length in half-centimetre groups																							
	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	Total
3	—	—	—	2	—	—	—	1	—	1	1	4	2	4	2	2	2	1	—	—	—	—	—	—	22
4	—	1	—	4	2	6	—	13	2	10	4	7	4	6	3	4	4	3	1	—	—	—	2	—	76
5	—	3	2	1	4	9	6	10	8	24	15	28	17	23	15	17	7	8	2	1	1	1	—	1	203
6	—	—	—	3	1	4	4	3	10	17	3	10	7	23	9	11	2	—	3	—	—	1	—	—	111
7	1	—	1	1	—	3	3	1	1	11	3	6	5	11	6	8	4	10	—	2	—	1	—	—	78
8	—	—	—	3	1	6	3	4	3	4	3	11	7	9	—	4	4	5	—	2	—	1	—	—	70
9	—	—	1	—	1	1	—	1	—	7	4	2	1	2	4	3	1	2	—	—	1	—	—	—	31
10	—	—	2	1	—	—	1	—	—	1	1	7	2	1	1	2	1	1	—	1	—	—	—	—	22
11	—	—	—	—	—	1	—	1	1	1	1	1	—	—	—	—	—	1	—	1	—	—	—	—	8

In Table 2 the length composition is shown in half-centimetre groups. The majority of the fish lie within the 28.0 to 32.0 cm. range.

The L_1 distribution (length at the end of the first year calculated from the scales of the adults) is shown in Table 3 in half-centimetre groups. The dominant length group occurring within year classes varies from year to year. The 1958 year brood shows the dominant group to be 11.0 cm. In the 1957 and 1956 year broods, however, the dominant L_1 groups were at 13.0 and 14.0 cm., respectively. Further comment on the L_1 distributions cannot be made until several years' data have been accumulated. It will then be possible to estimate the number of year classes in which recruitment takes place in the fishery.

Echo-surveys: During the past three seasons all catches taken by Irish boats were in Keem Bay, off Achill Island, close inshore (Fig. 1). Extensive echo-surveys were carried out by the *Cú Feasa* from 27 August to 14 September, 1962. The area searched included Clew Bay, Keel Bay, Keem Bay and a region extending 10 to 12 miles on the seaward side of a line joining Achill Head and Inisturk Island. Good markings were recorded in the Keem Bay area between Dysaghy Rock and Carrickmore South on 28 August. Other small markings were found over a scattered area in Keel Bay. The first catch of herrings was not made until 12 September, despite the fact that the *Cú Feasa* had located fish markings every day from 28 August onwards. The fish traces recorded throughout the survey were invariably small and the presence of pilchards in the area also complicated the findings. Several times during the season mixed catches of herrings and pilchards were made in Keem Bay.

APPENDIX No. 28

MACKEREL INVESTIGATIONS, 1962

By

JOHN P. MOLLOY, B.Sc. (Assistant Inspector)

Samples of mackerel along the south coast of Ireland were obtained from Castletownshend, Helvick, Union Hall, Ballycotton and Clonakilty between 30 August and 7 September and from Castletownbere from 10 to 12 October. A sample was also obtained from Loughshinny, Co. Dublin on 14 September.

Each fish was examined for length, weight, sex and maturity. Otoliths were removed. Vertebral counts were also made but as these showed no variation, collection of such material was discontinued. The number of rays in the first dorsal fin were counted as an alternative meristic character. Variations in meristics may denote racial differences of fish shoals.

The results of examination of the samples from the undivided ports are detailed in Tables I to VI. For length, weight, sex and

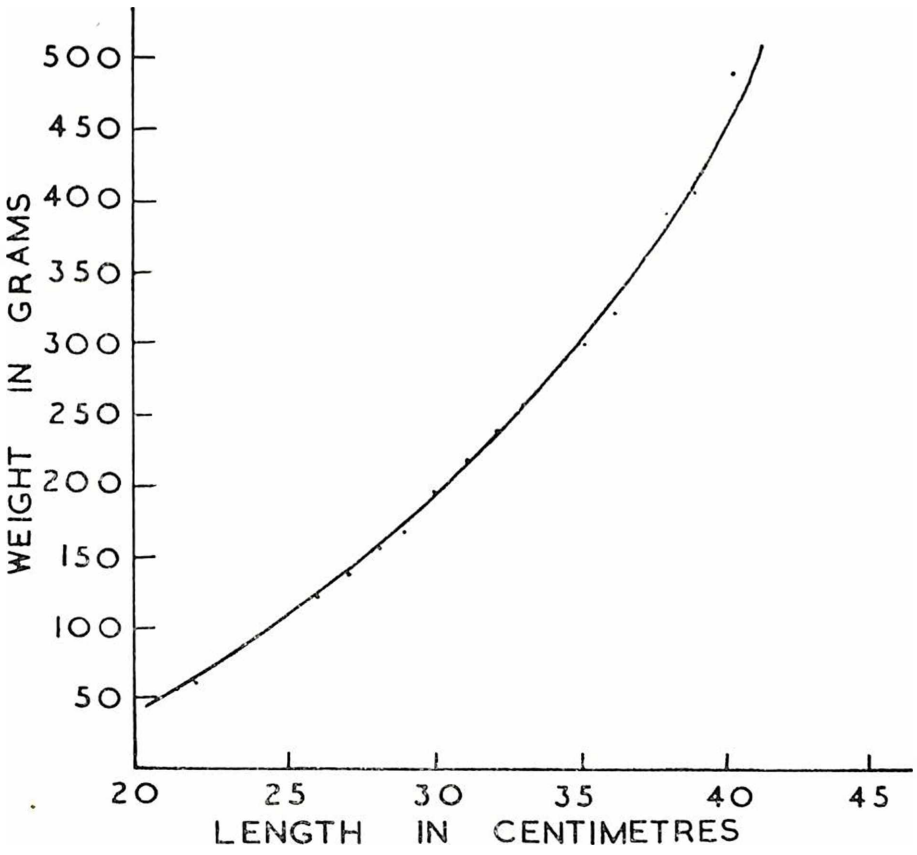

FIG. 1

maturity, age and dorsal fin counts the results may be summarised as follows:

Length and weight.—The total length of 844 fish was measured to the nearest millimetre and a range from 22.0 cm. to 42.5 cm. occurred, the majority of fish being between 26.0 cm. and 38.0 cm.—see length distributions per age class (Table I). The weight of each fish was recorded to the nearest gram and a range from 60 to 520 grams occurred. The length/weight relationship is given in Table II —see also Fig. 1.

Sex and maturity.—The stages of development of the sexual organs have been classified according to the scheme used by the late G. A. Stevens (*Journ. Mar. Biol. Assoc.* Vol. 30, pp. 549-567, 1952). All the fish examined were either (a) virgin individuals (stage I), (b) spents (stage VII), or (c) recovering spents (stage II B). It was found necessary to divide stage II into two substages—II A (maturing virgins or maiden fish) and II B (recovering spents). In early September, the adult fish were divided roughly into half spents and half recovering spents but by mid-October 84% were in the recovering spent condition. The maturity distributions per age class and percentage maturities are given in Tables III and IV.

Age and growth.—Readings of otoliths from 793 fish were made. Of these, 186 fish (23.5%) were recruits, i.e. two-year old fish (one winter ring). While in some samples these young fish were the dominant age group, they were completely absent in other cases. This is, presumably, because they leave earlier than the older fish for their winter grounds. These winter grounds are in deep offshore waters, where the fish change from their pelagic mode to a demersal one, and congregate in densely packed shoals on the sea bed. The mean lengths per age class are given in Tables V—see also Fig. 2.

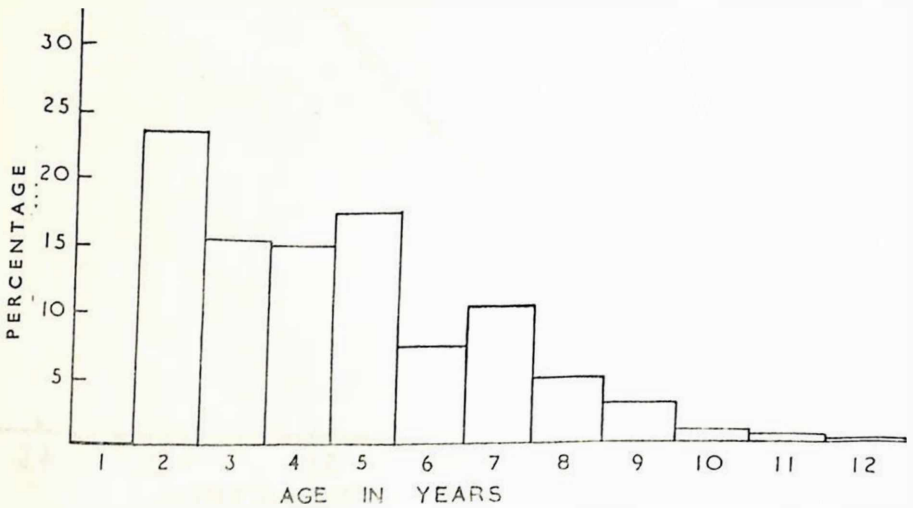

FIG. 2

TABLE I—Length (in cm.) distributions in each age class

	Age	Length in cm																	
		22	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	Total
Castleconnell	1				2	2	6				2	7	1							10
	2						2	6	9	9	7	3	2							28
	3									3	1	4	—	1	1					18
	4										1	2								6
	5												1	3						7
	6																			3
	7																			3
	8																			3
	9																			1
	Total				2	2	8	6	9	12	11	16	4	4	1					75
Helvick	2						1	1												2
	3								5	9	8	2	1							16
	4									4	3	4	4							14
	5										1	2	3	3	3					8
	6										1	—	1							7
	7																			10
	8																			1
	Total						1	3	5	13	13	8	9	3	3					58
Union Hall	2		2	11	30	25	2	2	1	6	6	2	1			1				73
	3				1			2	4	2	5	4	3	1						13
	4								1		1	1	1							11
	5												1	1						10
	6																			5
	7																			—
	8																			—
	9																			—
	10															1				1
	Total		2	11	31	25	2	4	6	8	12	7	3	1	—	1				113
Ballycotton	1	1																		1
	2			7	21	15	4	2	3	4	2	4	1	1	1	1				52
	3						1	1	5	5	7	3	7	2	1					13
	4								6	2	7	2	2	1	1					23
	5										1	2	2	2						12
	6											—	1	1						5
	7												7	2	1	1				13
	8										1			1						3
	9													2						2
	10																1			—
	11																			1
	Total	1		7	21	15	5	4	14	11	18	11	8	6	2	1	1			125
Clonakilty	2																			
	3			5	12	8	5	3	3	3	2	2	1	1	1	1				30
	4								2	6	7	8	—	3	2	1				11
	5								1	2	13	4	3	5	1	1				17
	6										1	2	2	6	2	1				26
	7											—	2	—	1	1				8
	8										1			1						12
	9																			12
	10																			4
	11																			1
	12													1						—
	Total			5	12	8	5	3	6	11	24	16	8	16	5	3				122
Age not Read				2	9	8	3	—	5	9	2	4	3	2	3	1				51
Total				7	21	16	8	3	11	20	26	20	11	18	8	4				173
Loughshinny	3									1	2	1								4
	4										3	3								6
	5									1	1	5	5	1	1					13
	6									1	1	—	4	8	2	1				15
	7											1	6	4	1					14
	8												2	—	1	1				3
	9														1					2
	10														1	2				2
	Total									3	7	10	17	13	5	4				59

TABLE I—(continued)

Length in cm.

	Age	22	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	Total
Castletownbere	2			2	3	5	5	2	2		3	1								19
	3							6	15	14	13	6	1							39
	4								2	10	32	13	—	1						32
	5								4	13	5	5	4							63
	6									1	6	8	14	4	2					15
	7										1	6	7	3	1					34
	8											1	5	6	2	2				18
	9												1	1	1					15
	10												1	1						2
	11																			3
	12																		1	1
	Total			2	3	5	5	8	23	38	60	40	33	15	6	2	—		1	241
All Samples	1	1																		1
	2			2	25	6	23	7	6		11	2								186
	3					1	3	20	41	46	51	26	2							124
	4					—		1	11	30	62	40	10	3						121
	5								5	18	11	18	15	14	2					138
	6									2	7	15	33	18	9	3				62
	7										3	6	13	12	5	1				85
	8												7	9	4	4				40
	9											1	1	—	1	3				24
	10												1	1	1	—	1			6
	11													1						4
	12													1					1	2
	Total	1	2	25	69	55	26	28	63	96	145	108	82	58	22	11	1		1	793

TABLE II—Average weight in grams in each centimetre length group

Port	Centimetres 22	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
(1) Castletownshend ..				157	164	204	214	244	258	275	309	329	345	367		
(2) Helvick						209	237	269	272	296	305	346	363	413		
(3) Union Hall ..		122	139	165	173	191	230	245	259	279	298	360	339		398	
(4) Ballycotton	59		145	160	173	189	219	245	248	285	328	341	366	434	377	486
(5) Clonakilty			140	156	172	194	219	235	265	276	298	333	375	385	424	
(6) Loughshinny ..									288	299	352	392	438	464	462	
Average for South Coast Ports (1) to (5) ..	59	122	141	159	171	197	223	245	261	290	306	340	360	397	406	486

TABLE III – Maturity distribution per age class

Port	Stage	Age												Age not read	Total	% distribution
		1	2	3	4	5	6	7	8	9	10	11	12			
Castletownshend	I		10												10	13.3
	IIB			23	9	2	3		1						38	50.5
	VII			5	9	4	4	2	2	1					27	36.2
	Total		10	28	18	6	7	2	3	1					75	100.0
Helvick	I															
	IIB		1	13	6	1	1	3							25	43.1
	VII		1	3	8	7	6	7	1						33	56.9
	Total		2	16	14	8	7	10	1						58	100.0
Ballycotton	0	1													1	0.8
	I		52	1											53	42.4
	IIB			7	11	6	3	5	2						34	27.2
	VII			5	12	6	2	8	1	2	–	1			37	29.6
	Total	1	52	13	23	12	5	13	3	2	–	1			125	100.0
Union Hall	I		73												73	64.6
	IIB			8	6	4									18	15.9
	VII			5	5	6	5	–	–	–	1				22	19.5
	Total		73	13	11	10	5	–	–	–	1				113	100.0
Loughshinny	IIB			4	6	12	13	14	2	1	1				53	89.8
	VII					1	2		1	1	1				6	10.2
	Total			4	6	13	15	14	3	2	2				59	100.0
Castletownbere	I		13	12											25	10.4
	IIB		6	21	24	53	12	31	16	13	2	3			181	75.1
	VII			6	8	10	3	3	1	2	–	–	1		34	14.1
	VIA								1						1	00.4
	Total		19	39	32	63	15	34	18	15	2	3	1		241	100.0
Clonakilty	I		21											10	31	17.9
	IIB		9	4	7	8	–	2	3	2	1			22	58	33.6
	VII			7	10	18	8	10	9	2	–	–	1	19	84	48.5
	Total		30	11	17	26	8	12	12	4	1	–	1	51	173	100.0
Total Results (all samples)	0	1													1	0.1
	I		169	113										10	192	22.9
	IIB		16	80	69	86	32	55	24	16	4	3		22	407	48.5
	VII		1	31	52	52	30	30	15	8	2	1	2	19	243	28.4
	VIA								1						1	0.1
	Total	1	186	124	121	138	62	85	40	24	6	4	2	51	844	100.0

TABLE IV—Percentage maturity stages of the adult fish

	IIB.	VII	
Castletownshend	58.5	41.5	
Helvick	43.1	56.9	
Union Hall	45.0	55.0	1 September
Ballycotton	47.8	52.2	
Clonakilty	40.8	59.2	
Loughshinny	89.8	10.2	14 September
Castletownbere	84.9	15.1	11 October

TABLE V—Mean length (cm) per age class

	Age (years)											
	1	2	3	4	5	6	7	8	9	10	11	12
Castletownshend ..	—	29.8	32.8	34.7	35.5	36.2	35.0	36.7	37.3	—	—	—
Helvick ..	—	30.9	33.0	34.3	35.5	36.9	36.1	—	—	—	—	—
Union Hall ..	—	28.4	32.6	34.2	34.9	35.8	—	—	—	39.0	—	—
Ballycotton ..	22.0	28.9	32.7	33.6	34.4	36.0	36.6	35.8	37.1	—	40.5	—
Clonakilty ..	—	28.9	33.1	33.7	34.9	35.8	36.7	36.7	37.8	38.9	—	—
Loughshinny ..	—	—	34.4	34.8	36.2	36.7	37.1	37.6	39.0	39.0	—	—
Castletownbere ..	—	30.4	32.8	34.0	34.3	35.4	35.6	36.6	37.2	36.0	37.5	42.2

Dorsal fin count.—The number of rays in the first dorsal fin were counted and a range from ten to fourteen occurred. The fish lengths were arranged in 5 cm. groups and the average number of rays for each group is indicated in Table VI. The number varies according to the size of the fish, getting progressively smaller as the fish get larger. Only 241 fish were examined for this character and larger numbers will be required for satisfactory conclusions.

TABLE VI—Number of rays in the first dorsal fin in the different length groups for samples from Castletownbere

	Length in cm.																			
First Sample 120 fish (10/9/62)	(25	26	27	28	29)	(30	31	32	33	34)	(35	36	37	38	39)	(40	41	42	43	44)
No. of Fish				3	2	5	5	16	20	24	19	19	4	3						
Mean Dorsal fin count				11.66	11.00	11.33	11.40	11.56	11.40	11.54	11.26	10.84	10.75	11.66						
Mean count per 5 cm. group	(		11.33		)	(			11.45		)	(			11.13		)	(		)
Second Sample 121 Fish (12/9/62)																				
No. of Fish			2		3		3	7	16	37	22	14	12	2	2			1		
Mean dorsal fin count			13.00		12.66		12.33	12.13	11.94	11.43	11.50	11.50	11.33	10.50	12			11		
Mean count per 5 cm. group	(		12.83		)	(			11.96		)	(			11.36		)	(		)

APPENDIX No. 29

SMOLT TAGGINGS IN IRELAND (1952-1955)

By

ARTHUR E. J. WENT, D.Sc. (Inspector and Scientific Adviser)

In a previous paper the writer (Went, 1953) gave a short account of the smolt taggings carried out in the Rivers Foyle and Bann from 1909 to 1921, inclusive. Further investigations were carried out in the period 1952 to 1955 when large numbers of salmon smolts were tagged in the Rivers Blackwater, Erne and Shannon. On the Blackwater smolts were captured at Clondulane Weir below Fermoy ; on the Erne one of the suitable pools in the uppermost fish pass at Cliff, just below Belleek, was used to take smolts and on the Shannon smolts which entered the ship locks at Ardnacrusha were taken by hand nets when the locks were emptied at night.

Three types of tags were used, namely,

1. Small Lea hydrostatic tags as already described by Went (1951) ;
2. Carlin (Swedish) type tags and
3. Small thin square plastic tags with the letters *IRE* on one side and a serial number on the other. Similar tags to these with the letters *SRT* are used by the Salmon Research Trust of Ireland Inc. (*Annual Report*, 1960).

The numbers of tags recovered were very small. The different types of tags were used under a wide range of conditions and, consequently, little significance can be attached to the differences in percentage recovery of the different types of tags or for the three river systems (Table 1). The percentage recoveries of tagged smolts

TABLE 1—Details of the results of tagging programmes on the Rivers Blackwater, Erne and Shannon

	River		
	Blackwater	Erne	Shannon
Number Tagged	6,269	1,093	5,461
Years of Tagging	1952/55	1952/53	1953/55
RECOVERIES :			
On clean adult fish ..	4*	1	18
Still as smolts	5	4	2
In trout stomachs ..	16	5	—
In pike stomachs ..	—	—	1
In heron's nest	—	—	20
Tags only	4	2	1
Total	29	12	42
Percentage as clean fish ..	0.06	0.09	0.33

* One said to have been a sea trout.

were very much lower than those for the Foyle and Bann reported earlier (Went, 1953). The details of the individual clean fish recovered have been given in Table 2. With two exceptions the clean fish were recovered in the river, or in the estuary of the river, where tagging and release took place. The two exceptions were those fish tagged in the Blackwater and recovered

TABLE 2—Details of clean fish recovered

Type of tag	Date of tagging and release	Date and place of recapture	Length in inches	Weight in lb.	Method of capture
		RIVER BLACKWATER			
Lea ..	23/4/52	9/6/53 Corrigeen, Bandon R.	25.0	4.75	Draft net
,, ..	24/4/52	3/5/54 Ardsallagh, Blackwater	30.0	10.50	Drift net
,, ..	22/4/53	Oct., 1954, Lismore ..	—	—	Draft net
Carlin*	11/4/53	21/7/53 R. Esk ..	15.0	1.00	Rod
		RIVER ERNE			
Lea	15/5/52	April, 1957 Erne Estuary	—	—	Draft net
		RIVER SHANNON			
Carlin	14/5/53	24/2/56 Shannon ..	31.1	12.5	Weir
Lea	21/5/54	28/6/55 ,, ..	24.0	4.75	,,
Plastic IRE	5/5/55	15/4/57 ,, ..	—	8.75	Stake net
,,	5/5/55	13/6/56 ,, ..	24.0	5.00	Drift net
,,	5/5/55	2/7/56 ,, ..	21.0	4.00	,,
,,	5/5/55	18/4/57 ,, ..	28.0	11.00	,,
,,	6/5/55	27/6/56 ,, ..	24.5	6.5	Weir
,,	6/5/55	2/7/56 ,, ..	23.0	5.5	,,
,,	6/5/55	2/5/57 ,, ..	—	11.5	,,
,,	6/5/55	31/5/56 ,, ..	23.2	4.75	,,
,,	6/5/55	10/6/56 ,, ..	22.0	2.63	Drift net
,,	6/5/55	9/3/57 ,, ..	27.5	8.25	Stake net
,,	12/5/55	7/2/57 ,, ..	—	10.75	Rod
,,	12/5/55	15/4/57 ,, ..	—	8.25	Stake net
,,	12/5/55	Before 2/7/56 ,, ..	26.0	5.0	—
Lea	18/5/54	22/6/55 ,, ..	22.5	3.75	Drift net
,,	18/5/54	7/5/56 ,, ..	30.5	8.00	Rod
,,	18/5/54	24/2/56 ,, ..	31.1	12.5	Weir

* Said to have been a sea trout.

(1) in the tidal waters of the Bandon River and

(2) in the River Esk on the borders of England and Scotland, a little more than three months after it was tagged.

The latter fish was then described as a sea-trout. In some cases scales were returned with the tags and it was possible to verify the life history of the fish. Whether the fish returned as spring or summer fish was not relevant to the purpose of those experiments.

Eleven fish were retaken still as smolts and the details of most of these are given in Table 3. Smolts tagged at Clondulane were recaptured, still as smolts, 17 to 31 miles downstream, 2 to 9 days after tagging. The apparent speeds of movement downstream range from 1.9 to 12.5 miles per day (Table 3).

TABLE 3—Details of fish recovered whilst still as smolts*

Type of tag	Where liberated	Date of tagging and release	Details of recapture		
			Date	Place	Distance in miles from tagging station
Lea	Blackwater	23/4/52	2/5/52	Cappoquin	17 (1.9) †
"	"	23/4/52	29/4/52	Youghal Bay	31 (5.2)
"	"	16/4/53	22/4/53	Youghal Bridge	29 (4.8)
"	"	11/4/53	13/4/53	Ballinaclash	25 (12.5)
"	"	29/4/54	7/5/54	Youghal Bay	31 (3.9)
"	Shannon	18/5/54	20/5/54	5 miles below Limerick.	7 (3.5)
"	"	18/5/54	18/5/54	Corbally	1

* All the smolts were retaken immediately below the tagging station in the case of the River Erne.
† Figures in brackets are speeds in miles per day.

A considerable proportion of the tags recovered came from predators of salmon and trout. In all, 21 tags came from the stomachs of brown trout and one from a pike's stomach. One brown trout, weighing 2½ lb., taken at Careysville, just below the Clondulane tagging station, had in its stomach five Lea-type and four plastic tags. The fish was said by its captor to have been in poor condition. Another brown trout weighing 9½ oz. had two Lea and two Carlin-type tags in its stomach. Another of unknown weight had two Lea-type tags in its stomach. Five tags were found in the stomach of a brown trout weighing 2½ lb., taken just below the Erne tagging station. Whether this was normal predation or not we do not know. Piggins (1958) has also recorded heavy predation by brown trout on tagged salmon smolts in the Burrishoole River system.

Pike have long been known as predators of salmon and trout so it was not surprising to have one of the tags from the River Shannon recovered from the stomach of a 10 lb. pike.

The most notable of the recoveries from predators occurred in connection with taggings on the River Shannon. In all, 20 tags were recovered from the base of a tree upon which there were several nests of herons (*Ardea cinerea*). Apparently the adult birds had been feeding upon salmon smolts and had taken some of the tagged fish. The tags had evidently gone through the gut of the bird unchanged because in many cases the tag was partially enclosed in the droppings. Unfortunately we do not know to what extent herons in this region

feed on untagged smolts during the smolt run or whether the tag had made the fish either more conspicuous or incapable of normal movements, thus facilitating their capture by the predatory birds.

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APPENDIX No. 30

SALMON REARING EXPERIMENTS IN LOUGH KNADER, A SMALL LAKE IN CO. DONEGAL, IRELAND

By

ANN HEWETSON, M.Sc. (Assistant Inspector)

Lough Knader is a small lake of thirteen acres, situated about one mile to the east of Ballyshannon Town. It is 118 feet above sea level and has a small catchment area of one to two square miles. It is fed by two inlet mountain streams and empties itself into the River Erne by an artificially constructed stream. This stream enters the Erne reservoir just upstream of the Hydro-Electric Station at Cathaleen's Fall. It is the only outlet from the lake which has an average depth of ten feet and a maximum depth of twenty feet with a volume of six million cubic feet of water. The water is alkaline with a pH of 7.3 and a mineral content as follows:—

Alkalinity	expressed as $CaCO_3$	23	p.p.m.
Total Hardness	„ „ $CaCO_3$	31.6	„
Silica	„ „ SiO_2	1.4	„
Iron and Aluminium	„ „ $Fe_2O_3 + Al_2O_3$	0.5	„
Calcium	„ „ CaO	12.0	„
Magnesium	„ „ MgO	4.4	„
Alkalis	„ „ Na_2O	16.0	„
Sulphate	„ „ SO_3	2.6	„
Chloride	„ „ Cl_2	20.0	„

This analysis was made in 1959 prior to the stocking of the lake.

In 1958 it was decided to undertake a series of salmon rearing experiments in this lake with a view ultimately to supplementing the natural salmon rearing potential of the River Erne System. The initial step in this direction was the removal of the then existing stock of fish and this was carried out in October 1958 when the lake was treated with rotenone. The following numbers of fish were recovered:—

21	Trout (*Salmo trutta* L.)	
331	Perch (*Perca fluviatilis* L.)	
2	Rudd (*Scardinius erythrophthalmus* (L.))	
	Eels (*Anguilla anguilla* (L.))	Large population (not counted)
	Three spined stickleback (*Gasterosteus aculeatus*)	Large population (not counted)

My colleague Miss E. Twomey has been good enough to prepare details of the food of trout and perch killed during the rotenoning of the lake in 1958.

The size range of the trout was from 4.1 cm. to 30.5 cm. Fish in their second year (1 + age group) were dominant, comprising 50 per cent. of the total. The growth rate, calculated from scale reading in the usual manner, was as follows:

1st year	...	5.7 cm.
2nd „	...	14.0 „
3rd „	...	27.7 „
4th „	...	26.8 „

The average weight of the trout was 85 gr. and the range was from 2.8 gr. to 240 gr. The stomach contents of all the fish taken were examined. The larger fish, with one exception, had empty stomachs. In the smaller fish terrestrial insects were the dominant food. The stomach contents are listed hereunder:—

Food	dominant	present
Cladocera	1	1
Trichoptera (larvae) ...	1	1
Coleoptera (larvae) ...	2	3
Chironomid (larvae) ...	—	2
Terrestrial insects ...	6	6

The lengths and weights of all perch taken in 1958 were recorded. The dominant length group was the 18-20 cm. group. Over 90% of the fish had lengths between 14 cm. and 20 cm. The average weight was 39.7 gr.

Stomach contents from a representative sample of perch were taken. All the smaller fish (6-8 cm. group) fed exclusively on Cladocera. The 14-20 cm. group fed on Odonata nymphs, Chironomid and Caddis larvae. Fish remains were found in the larger fish. Approximately one-third of the fish had empty stomachs. The stomach contents are listed hereunder:—

Food	dominant	present
Cladocera	17	17
Asellus	—	2
Gammarus	—	2
Trichoptera (larvae) ...	1	1
Chironomid (larvae) ...	6	6
Odonata (nymphs) ...	22	22
Plecoptera (nymphs) ...	—	2
Fish remains	2	2

Subsequently a trap was constructed in the outlet stream approximately 200 yds. from the lake shore and in the spring of 1959, 10,000 unfed salmon fry were planted in the lake.

Three small fish appeared in the trap in 1960 and they were not identified. As they may have been brown trout they have been ignored for the purposes of this paper. In April 1961 a total of 313 smolts moved down into the trap and were tagged and released into the fish pass at Cathaleen's Fall just at the head of the tide-way. These smolts were in very good condition. The following was the size range:—

No. of smolts	*Size range in cms.*
5	11-12.9
86	13-14.9
162	15-16.9
60	17-18.9
Total 313	Average size 15.6

Only one of these tagged smolts has been recaptured to date. The details are:—

	Release			Recapture		
Date	Time in hrs.	Date	Time in hrs.	Place	Distance travelled in miles	Method of capture
15/4/61	20.00	17/4/61	15.00	Cassan Sound Killultan	14 (minimum)	Herring ring net

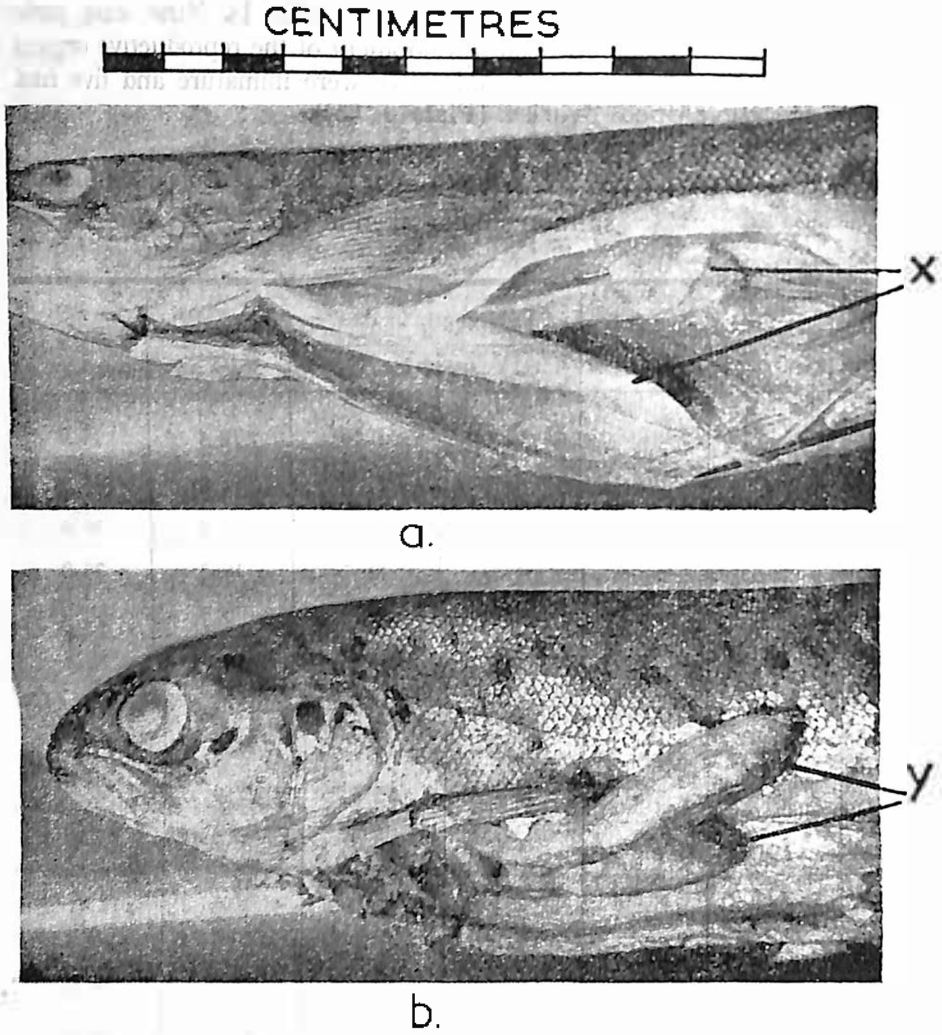
There was no migration of three-year old smolts in the spring of 1962 and by then it had become apparent that there was a population of trout in the lake. Consequently in August, 1962 the lake was again treated with rotenone when 19 young salmon parr were recovered. In addition, 221 trout with large numbers of eels and three spined sticklebacks were recovered. The two latter species were not counted.

Thus the survival rate of salmon in the Lough was at least 3.3%. The nineteen young salmon killed by rotenone in 1962 showed

remarkable uniformity in growth rate (Table 1). Nine were male fish and all showed advanced development of the reproductive organs (Plate 1 (a)). Of the ten females five were immature and five had very well developed ovaries (Plate 1 (b)).

TABLE 1—The details of weight, length and sex of the nineteen salmon smolts taken in 1962

No.	Weight in gr.	Sex	Length in cms. at end of			Length at capture
			1st Year	2nd Year	3rd Year	
1	241	Male	6.4	12.5	18.4	24.9
2	198	Female	4.5	11.0	18.0	23.7
3	241	Female	3.1	11.7	18.5	24.0
4	255	Male	4.5	11.7	19.3	26.0
5	227	Male	5.1	12.1	17.7	24.9
6	241	Female	5.1	12.6	19.5	24.9
7	235	Female	3.0	10.8	17.1	25.0
8	283	Male	6.3	15.8	21.2	26.5
9	269	Female	5.0	12.4	22.4	24.5
10	198	Male	3.4	10.7	18.2	24.5
11	241	Female	4.4	12.4	20.3	25.8
12	255	Male	5.1	15.0	20.1	25.5
13	241	Female	3.9	12.5	18.7	24.5
14	255	Female	3.1	11.4	19.1	24.5
15	326	Male	5.0	11.9	18.9	25.0
16	283	Female	4.8	11.9	19.9	24.5
17	227	Male	3.2	11.8	18.7	25.2
18	255	Male	3.6	9.7	17.2	24.1
19	269	Female	3.6	9.8	19.7	24.75



An examination of the stomach contents revealed that sixteen young salmon (84%) had empty stomachs. Of the remaining three, two had been feeding on sticklebacks and the third had the remains of beetle larvae in its stomach.

The population of trout in the lake in 1962 was probably due to the survival of a small number of trout in one of the feeding streams, which was not treated with rotenone during the original clearance in 1958. A number of trout redds were seen in this stream during the spawning season of 1961/62. There is every reason to believe that the treatment of the lake itself in 1958 was successful, as there were no perch or rudd recovered during the repeat rotenone experiment in 1962. Age determinations were undertaken for 205 of the brown trout with satisfactory sets of scales. Four age-groups were represented and the details of weight and growth rate are given in

Table 2. Just under 54% of the fish had empty stomachs. Of the remaining 46%, 84 were examined and the nature of the food in the stomach was found to be as follows:—

Trichoptera (larvae)	dominant in	22	present in	24
Coleoptera (larvae)	„	„	12	„	„	20
Chironomid (larvae)	„	„	7	„	„	11
Gammarus duebeni	„	„	18	„	„	18
Asellus aquaticus	„	„	6	„	„	11
Daphnia sp.	„	„	3	„	„	7
Hydrobia jenkinsi	„	„	3	„	„	3
Limnaea sp.	„	„	5	„	„	5
Corixa sp.	„	„	1	„	„	1
Terrestrial insects	„	„	4	„	„	9
Gasterosteus aculeatus	„	„	3	„	„	7

TABLE 2—Details of weight and growth rate of the brown trout taken in 1962

No.	Average weight in gr.	Age-group / Average length in cms. at the end of				Average length in cms. at capture
		1+ years				
		1st year				
125	62	6.2				15.9
		2+ years				
		1st year	2nd year			
25	130	5.3	14.5			19.9
		3+ years				
		1st year	2nd year	3rd year		
21	312	5.7	18.3	24.5		28.3
		4+ years				
		1st year	2nd year	3rd year	4th year	
34	371	5.6	18.4	23.9	27.6	29.7

Summary:

1. In 1958 the existing fish population in Lough Knader was removed by treating the lake with rotenone and in the spring of the following year 10,000 salmon fry were planted in the lake.

2. In the spring of 1961, 313 two-year old smolts migrated down into the trap at the outlet to the lake and were tagged and released.

3. There was no migration of three-year old smolts and in the autumn of 1962 the lake was again treated with rotenone. Nineteen three-year old salmon were recovered, thus bringing the survival rate of salmon to a minimum of 3.3%.

4. A large population of brown trout was also recovered from the lake on this occasion which is thought to have arisen from the survival in 1958 in one of the feeding streams of a small population of year-old trout. Details of growth and stomach contents of the trout are given.

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